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Drawing Book 8, Chapter 4: Details and cross-sections at subgrade locations

Include work order no. and floor no. if applicable

Roll # DB03	**Doc. ID (report #, dwg. #):**	
Document Date: 1968-69	**Document Author Name:**	**Author Organization:** SHC&R

KEYWORDS – HIGHLIGHT ALL THAT APPLY

Level 1

Bankers Trust	Project 4	WTC 1 - North Tower	Add
Below Grade	Project 5	WTC 2 - South Tower	
Concourse	Project 6	WTC 3 - Marriot Hotel	
Electrical Substation	Project 7	WTC 4 - South Plaza Bldg.	
Liberty Plaza	Project 8	WTC 5 - North Plaza Bldg	
PATH Station	WFC 1 - Oppenhiemer Dow	WTC 6 - Customs House	
PATH Terminal	WFC 2 - Tower B	WTC 7	
Project 1	WFC 3 - American Express	WTC Complex	
Project 2	WFC 4 - Tower D	WTC Plaza	
Project 3			

Level 2

Accident analysis & risk	Fire protection	Misc. Performance Problems	Structural
Architectural	Fire service	News coverage	Tenant alterations
Data request	Landscaping	Police	Tenant Space
Emergency management	Management	Security	Add
Evacuation	Mech./elec.		

Level 3

1993 explosion	Cranes	Frame	Roof	Weight
A/E fitout	Criteria	Frame analysis	Safety	Weld detail
A-242	Dampers	Frequency	Schedule	Weld size
A-36	Debris	Fuel	Sculpture	Welding
A-497	Deck	Furniture layout	Security system	Wind
Aircraft impact	Deflection	Generators	Shear knuckle	Windows
Air cooled condensers	Demolition	Guidelines	Shear test	Yield strength
Analysis	Design	Gypsum board	Shear Stud	Add
Angles	Detailing	Hat truss	Shop drawings	Drawing books
Antenna	Doors	Human comfort	Shortening	
Artifacts	Drawings	HVAC	Slab	
Asbestos	Eastern States Steel	Index	Slurry wall	
Base plate	Egress	Inspection	Smoke control	
Beams	Elevator	Insulation	Smoke test	
Bid documents	Elevator Shaft	Job number	Spandrel beam	
Bid Invitation	Emergency communications	Joist	Specifications	
Bow tie	Equipment	L-50	Splices	
Bracing	Erection marks	Lighting	Sprinkler	
Bridging truss	Errors & Omissions	Loads	Stability	
Building code	Escalator	Maintenance	Stairways	
Calculations	Expansion joint	Marking	Standards	
Carpet	Exterior columns	Mesh reinforcement	Steel	
Ceilings	Fabrication	Mill inspection	Steel composition	
Certification	Family member	Model	Stiffness	
Chillers	Field survey	Mullion	Structural review	
Cladding	Fire alarms	Operations	Surveillance	
Collapse	Fireproofing	Paint	Survey	
Columns	Fire spread	Partition layout	Survivor	
Communication systems	Fire testing	Partitions	Tenant list	
Composite truss	Firetower	Photos	Tenant occupancy	
Computer output	Flag Pole	Pipes	Testing	
Computer program	Flammability	Plumbing	Tie	
Concrete	Floor	Prestressing	Tolerances	
Connections	Floor load	Probability, uncertainty	Transfer Girders	
Construction	Floor slab	Quality control	Triad	
Contract	Floor system	Ramp	Truss	
Core beams	Floor trusses	Reinforcing (strengthening)	Vestibule	
Core columns	Formwork	Renovation	Vibration	
Corrosion	Foundations	Repair	Walls	
Cracking	Fracture	Research & Development	Water supply	
			Weather	

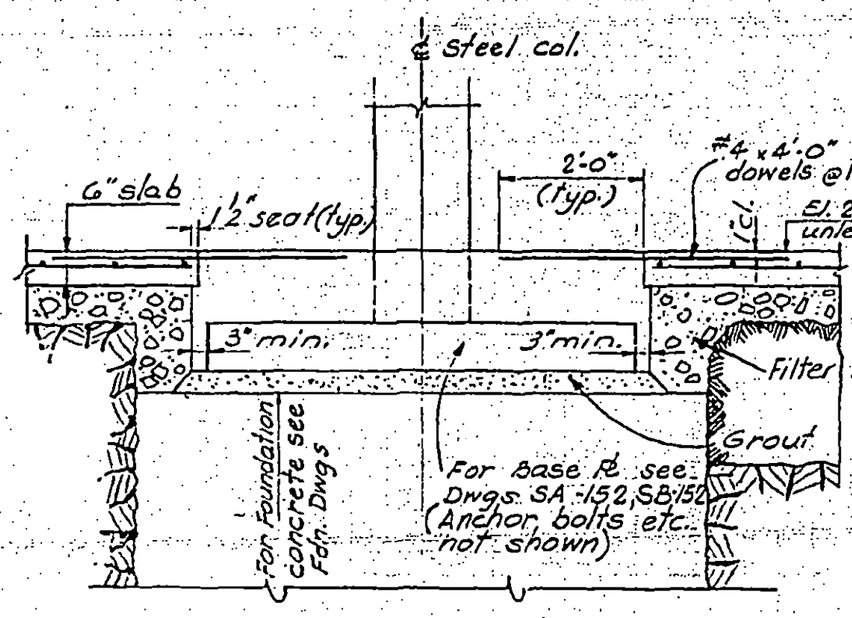
WTCI-1064-LERA

SKILLING - HELLE - CHRISTIANSEN - ROBERTSON Structural & Civil Engineers

PROJECT THE WORLD TRADE CENTER | TITLE SUBLEVEL #5 ENCASEMENT OF STRUCTURAL STEEL | DATE 5-1-68

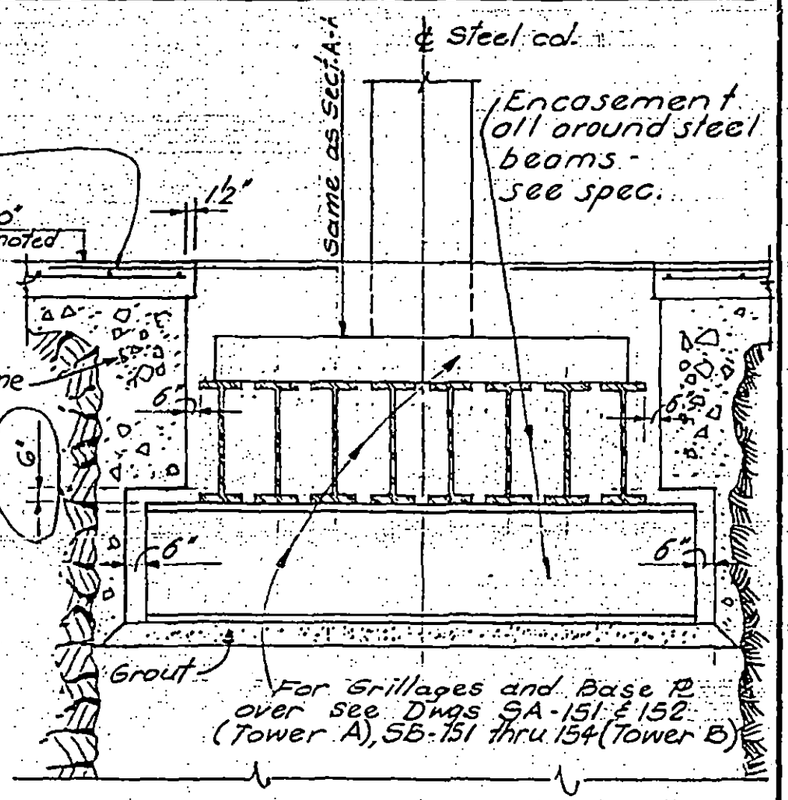
REVISIONS

5-9-69



Section A-A

Typical Encasement of Base Pl.



Section B-B

Typical at Foundation Grillages

Note to Sections A-A & B-B
Remove all forms.

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8-AB4-2.1

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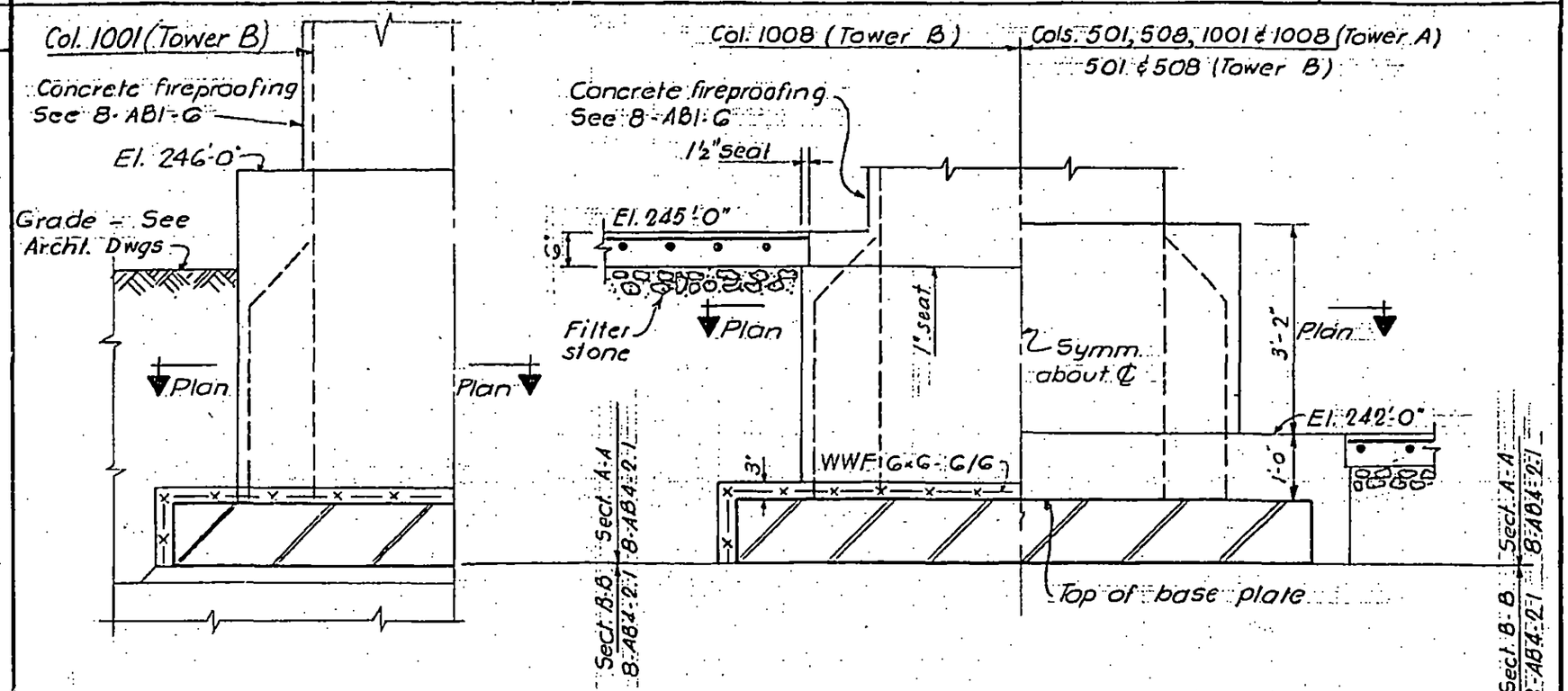
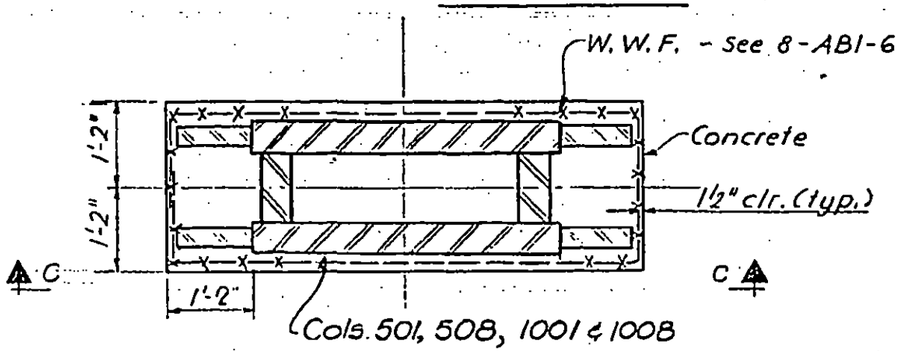
PROJECT THE WORLD TRADE CENTER | TITLE SUBLEVEL #5, ENCASEMENT OF STRUCTURAL STEEL | DATE 5-1-68

REVISIONS





Section C-C

Plan

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8-AB4-2.2

1064-L

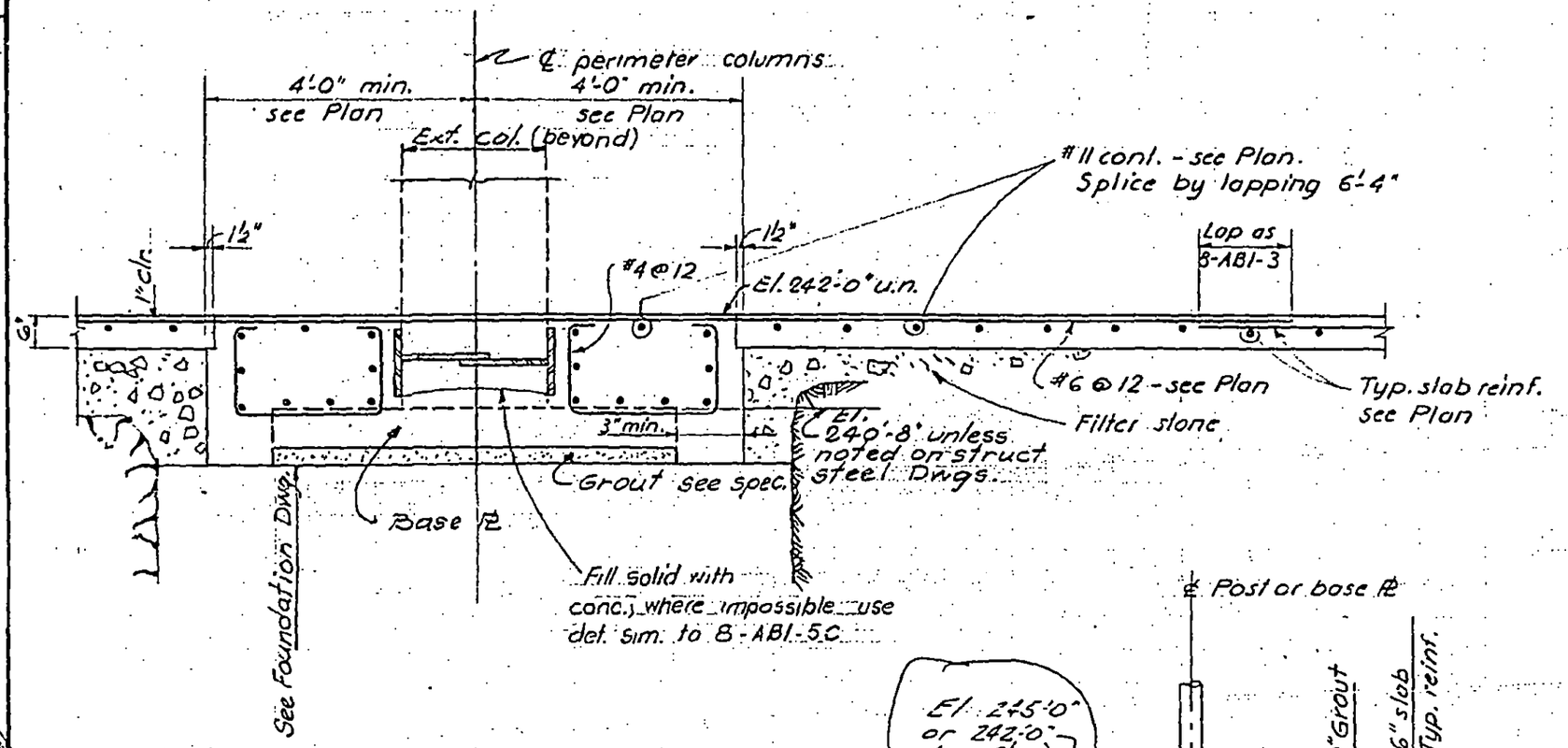
SKILLING - HELLE - CHRISTIANSEN - ROBERTSON Structural & Civil Engineers

PROJECT THE WORLD TRADE CENTER | TITLE SUB-LEVEL #5 - ENCASEMENT OF STRUCTURAL STEEL | DATE 5-1-68

REVISIONS

8-29-68

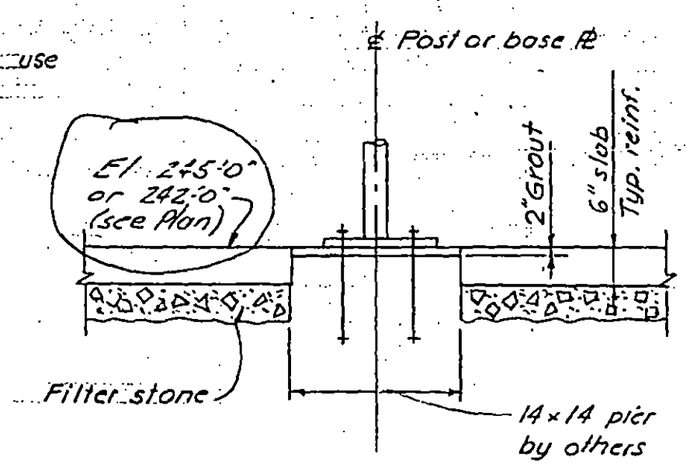
5-9-69



Section D-D

Typical Encasement to Bracing at Foot of Exterior Tower Cols.

Note: Remove all forms



Section E-E

Typical at Post

8-AB4-2.3

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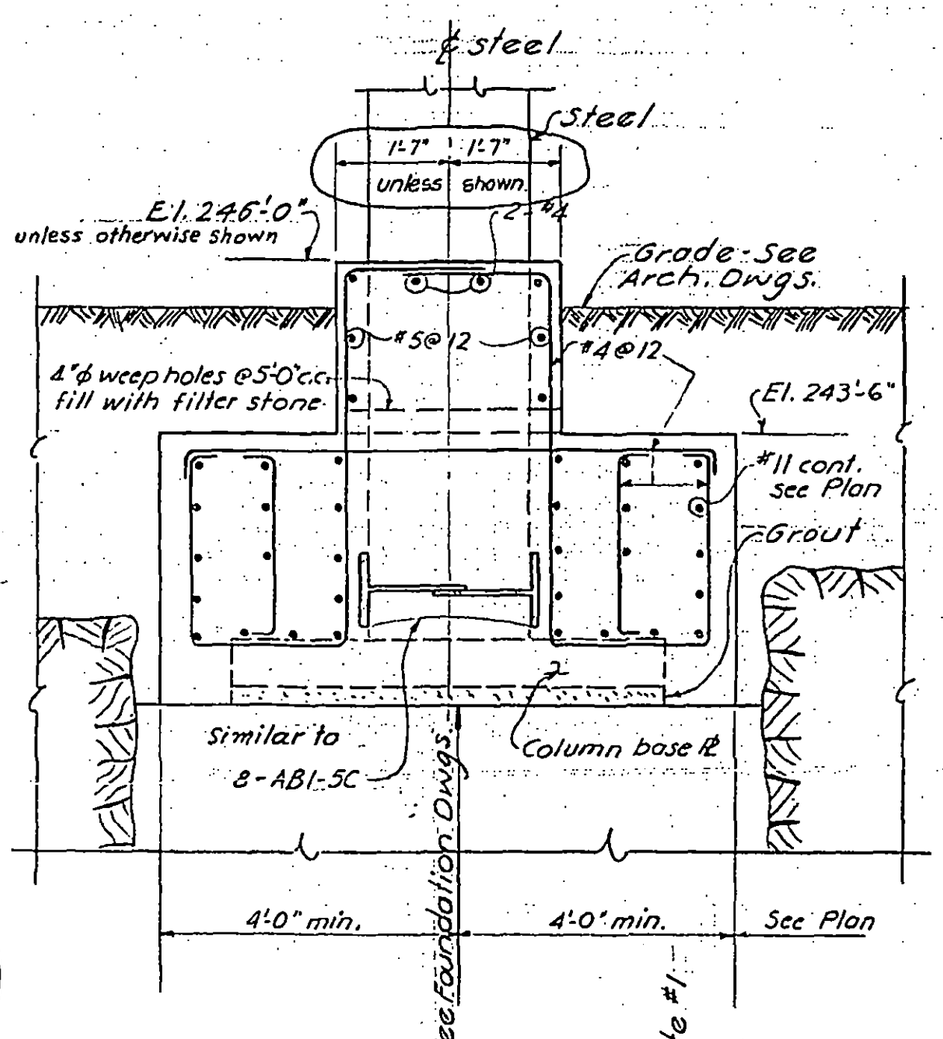
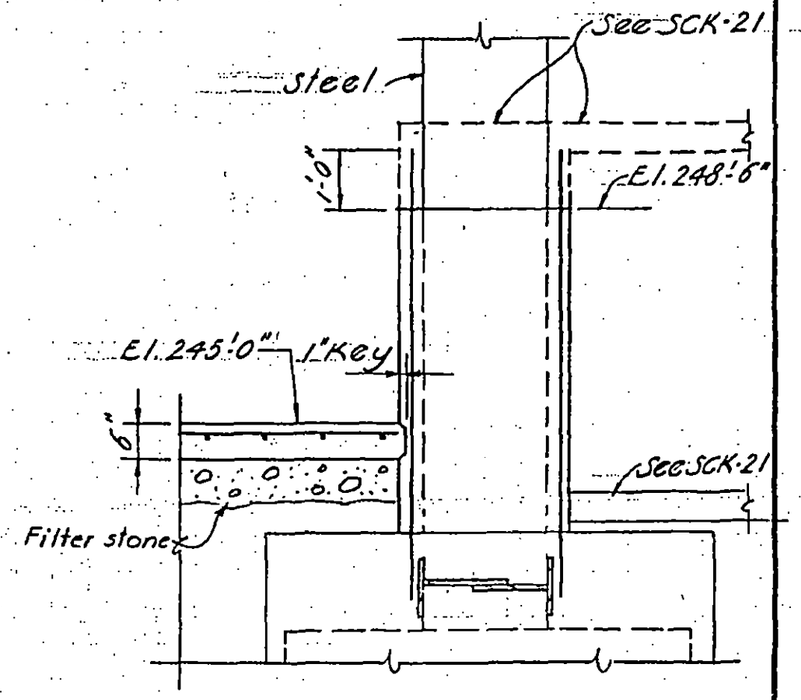
PROJECT THE WORLD TRADE CENTER | TITLE SUB-LEVEL #5-ENCASEMENT OF STRUCTURAL STEEL | DATE 5-1-68

REVISIONS

5-9-69

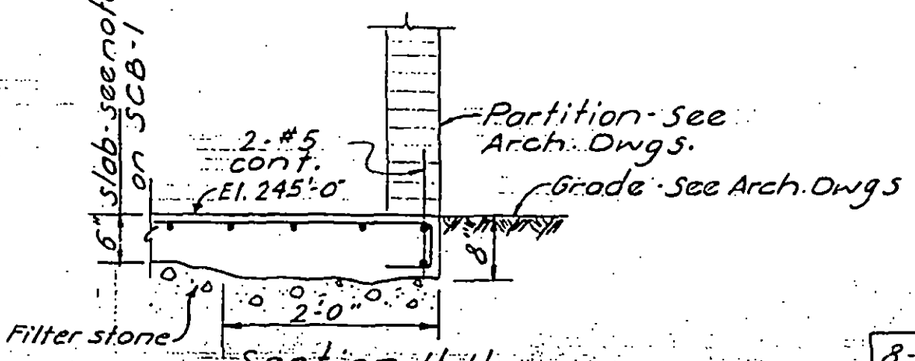


Section F-F



Section G-G

Similar to section F-F except as shown.



Section H-H

8-AB4-2.4

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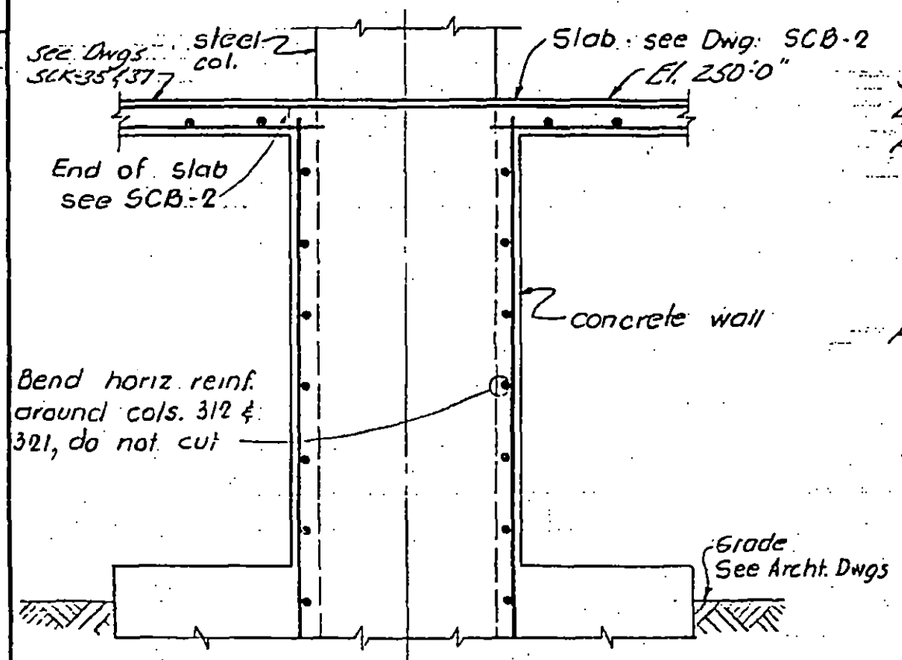
PROJECT THE WORLD TRADE CENTER | TITLE SUB-LEVEL #5 - ENCASEMENT OF STRUCTURAL STEEL | DATE 5-1-68

REVISIONS

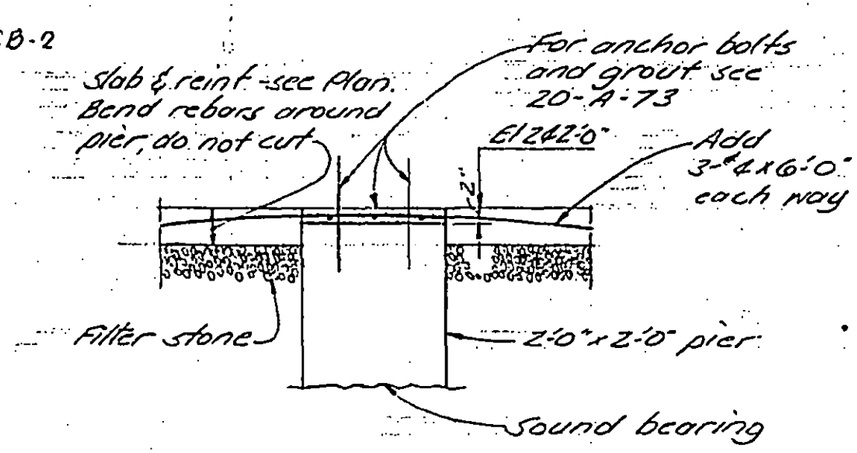
3-25-69

5-6-69

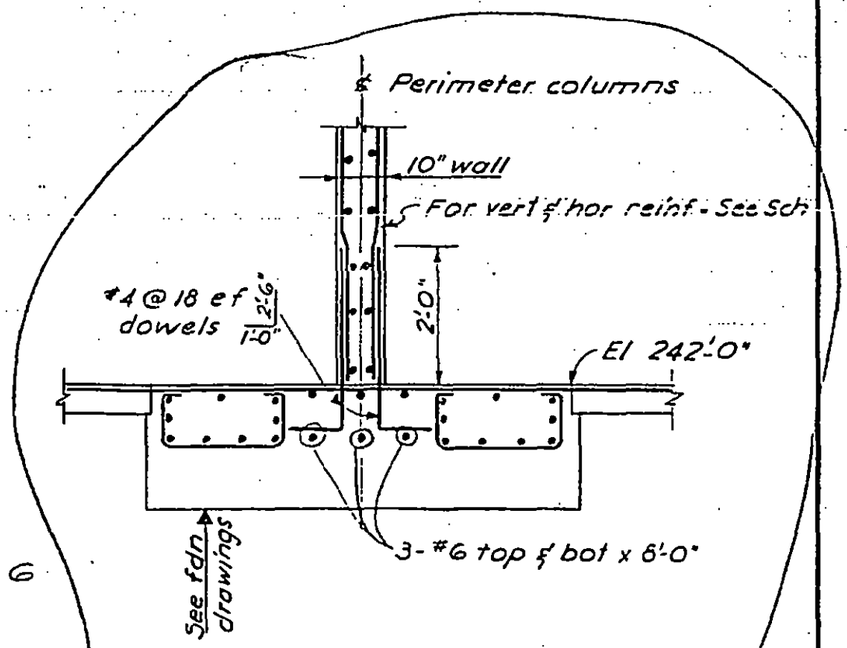


Section J-J

Similar to Section F-F except as shown



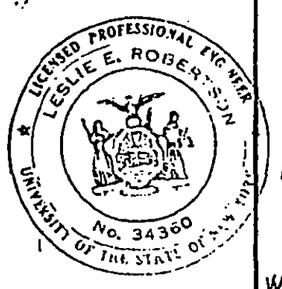
Section N-N

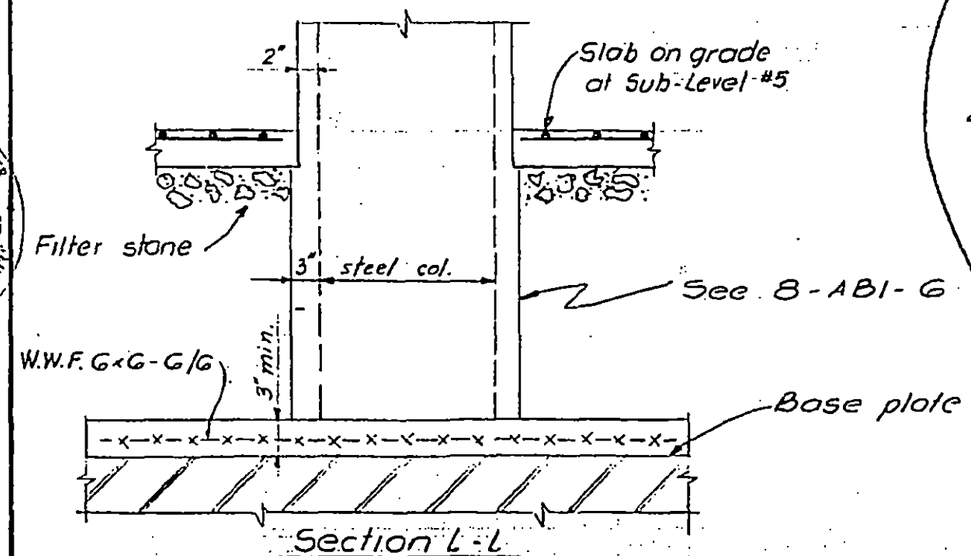


Section P-P

Same as Section 8-AB4-2D except as shown

5-6-69





Section L-L

Typical at Concrete Fireproofed Columns (unless noted)

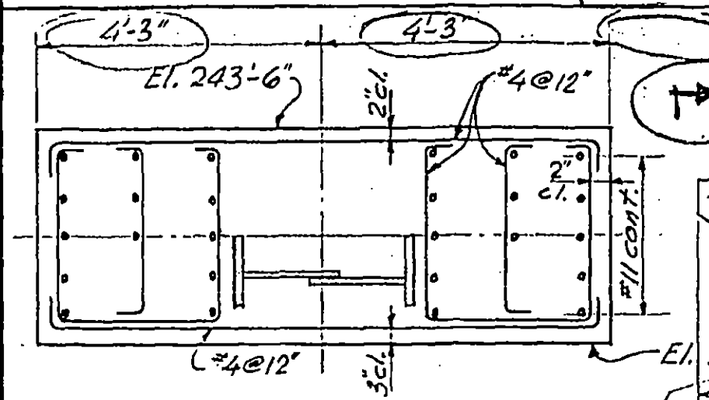
8-AB4-2.5

SKILLING, HELLE, CHRISTIANSEN, ROBERTSON — Structural & Civil Enginoors

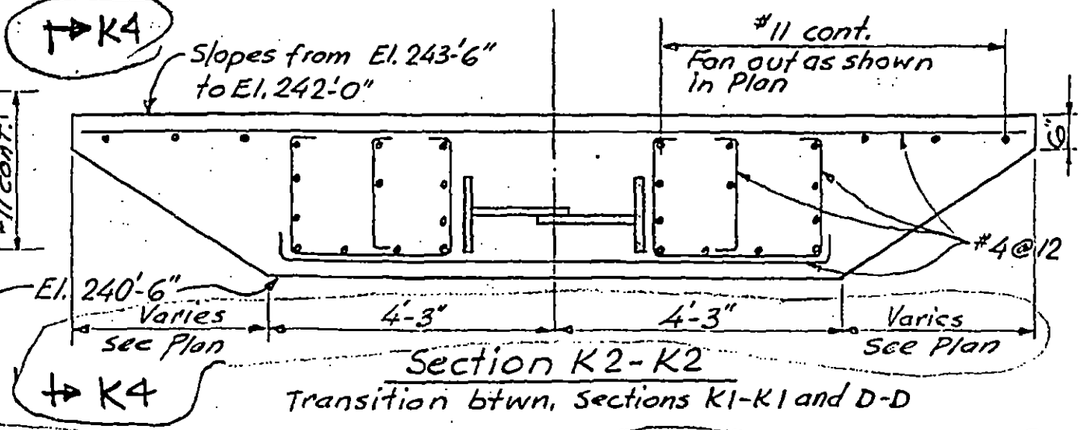
PROJECT THE WORLD TRADE CENTER | TITLE SUB-LEVEL #5 - ENCASEMENT OF STRUCT. STEEL | DATE 5-1-68

REVISIONS

12/12/69

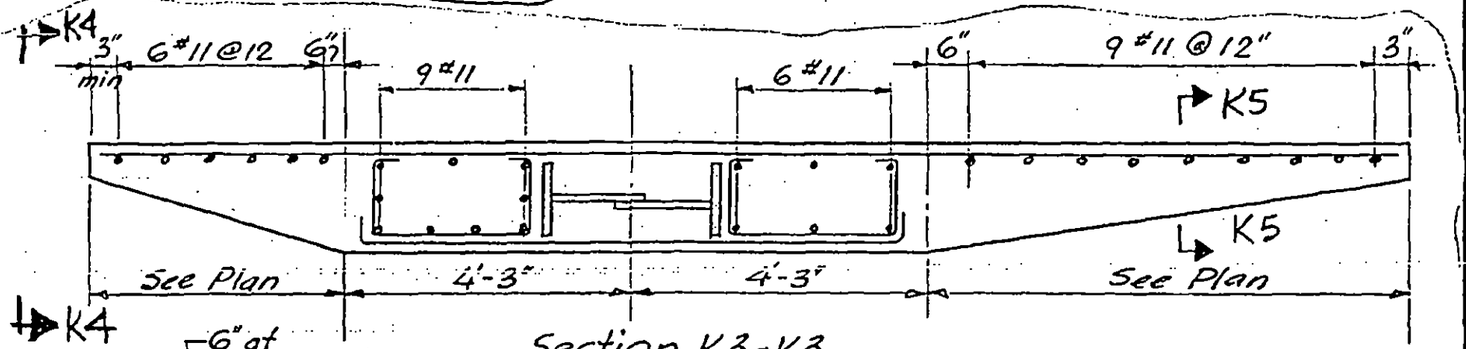


Section K1-K1



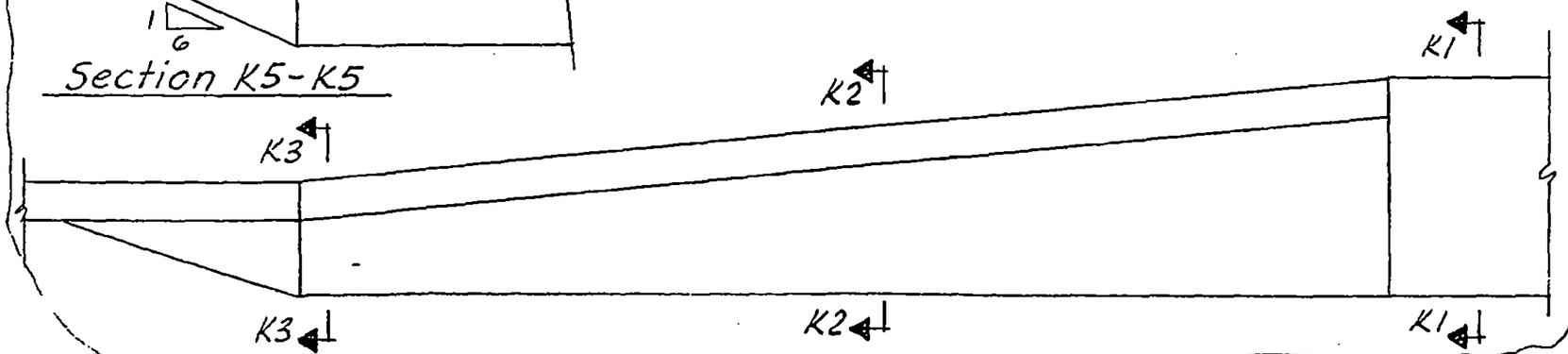
Section K2-K2

Transition btwn. Sections K1-K1 and D-D



Section K3-K3

Section K5-K5



Section K4-K4

8-AB4-2.6

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DESIGNED

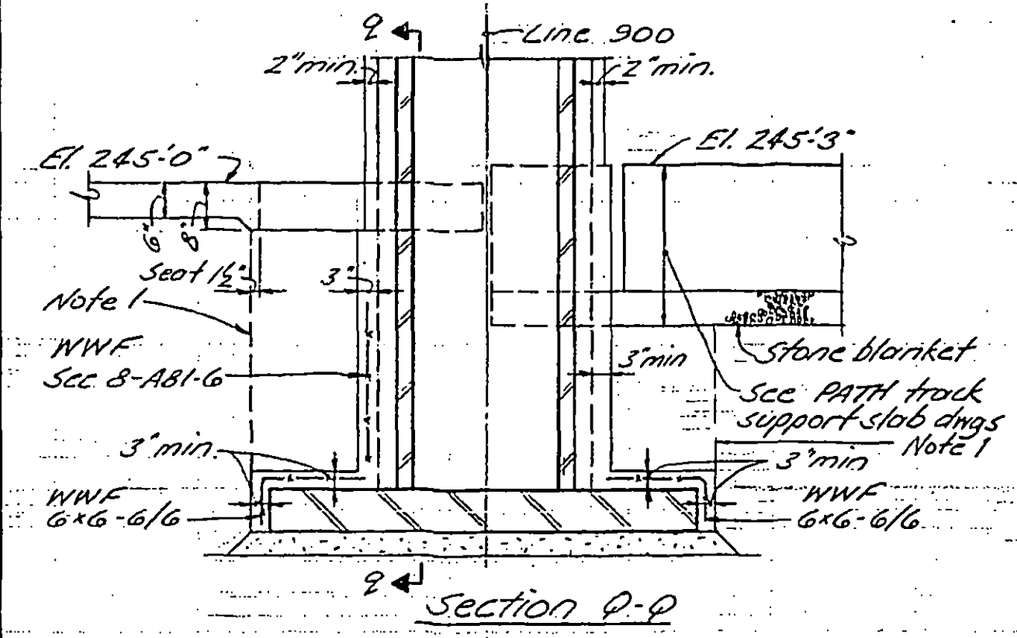
DRAWN

REVIEWED

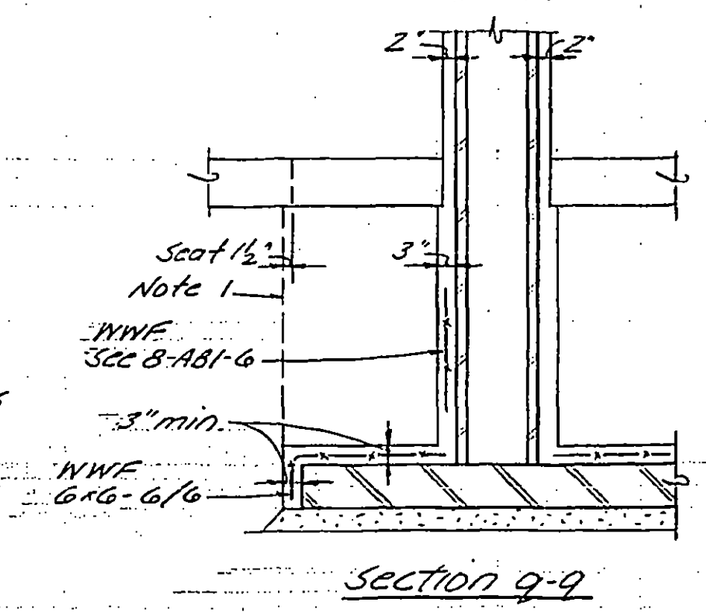
SKILLING, HELLE, CHRISTIANSEN, ROBERTSON — Structural & Civil Engineers

PROJECT: THE WORLD TRADE CENTER | TITLE: SUB LEVEL 5 - ENCASEMENT OF STRUCTURAL STEEL | DATE: 1-2-70

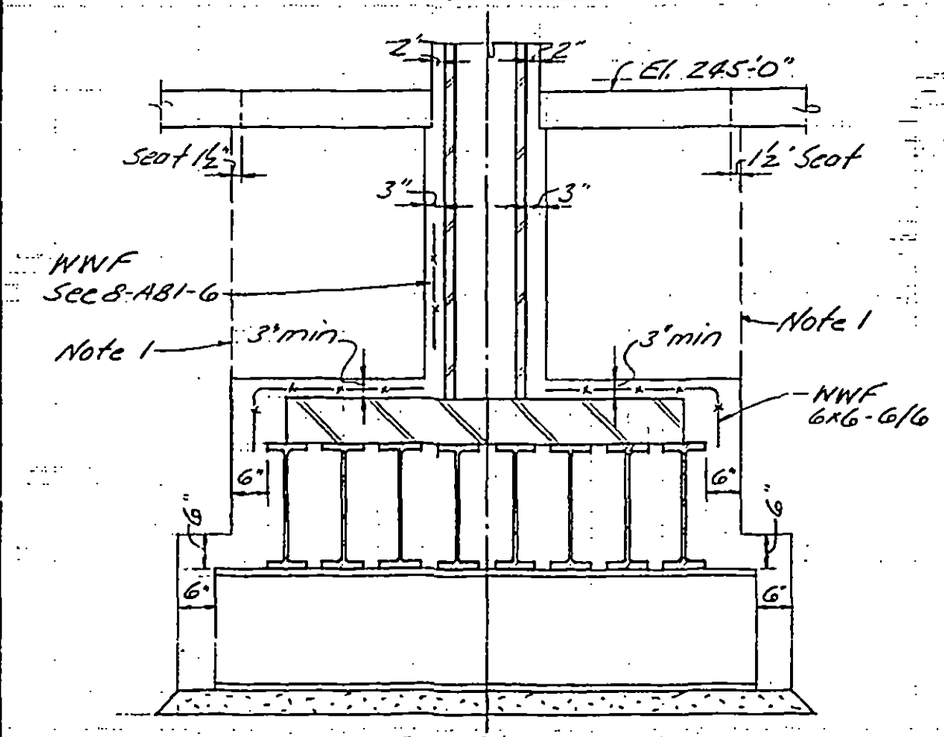
REVISIONS



Section ℄-℄



Section q-q



Section R-R

Note 1.
At Contractor's option concrete may be cast up to this line. Where this option used, omit WWF and provide #4 @ 12 each way 2" clear of face of concrete.

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DESIGNED

DRAWN
J. Adams

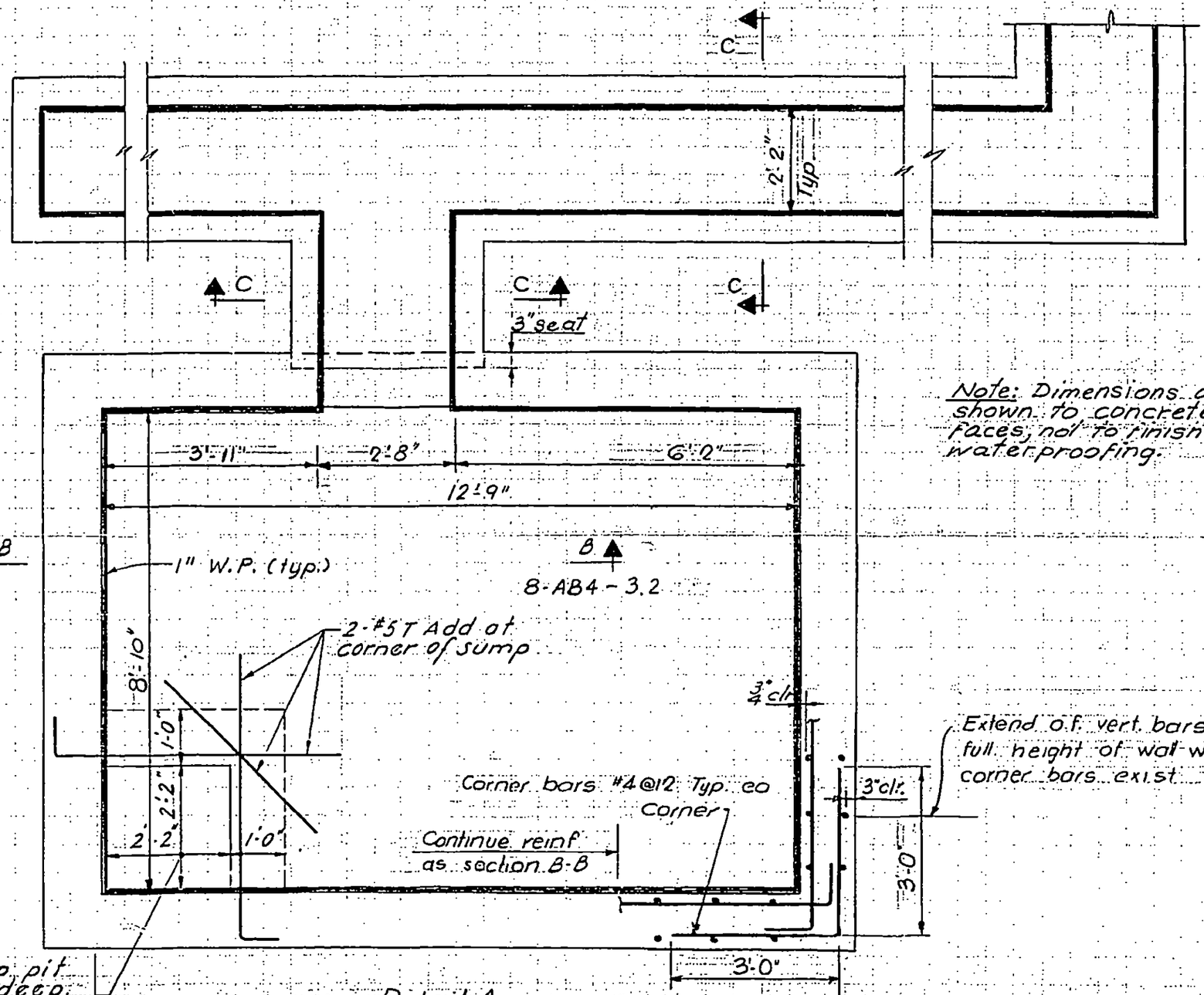
REVIEWED
W. Brewer

8-AB4-2.7

SKILLING - HELLE - CHRISTIANSEN - ROBERTSON Structural & Civil Engineers

PROJECT THE WORLD TRADE CENTER | TITLE SUB-LEVEL #5 CONDENSATE PIT & TRENCHES | DATE 5-1-68

REVISIONS



Note: Dimensions are shown to concrete faces, not to finished waterproofing.

Detail A

8-AB4-3.1

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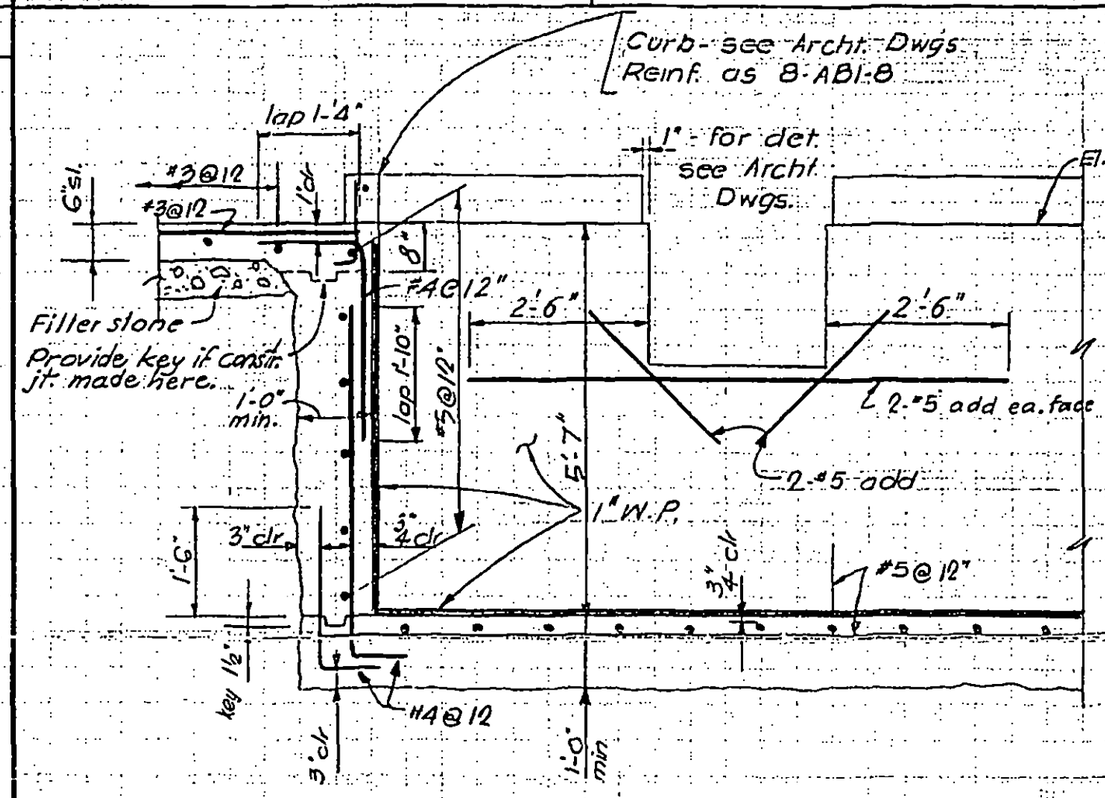
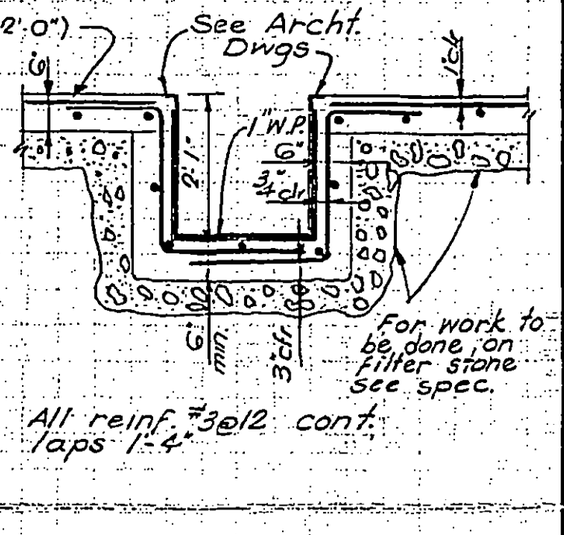
PROJECT THE WORLD TRADE CENTER | TITLE SUB-LEVEL #5 - CONDENSATE PIT & TRENCHES | DATE 5-1-68

REVISIONS



Section B-B



All reinf. #3@12 cont. laps 1'-4"

Section C-C
Typical

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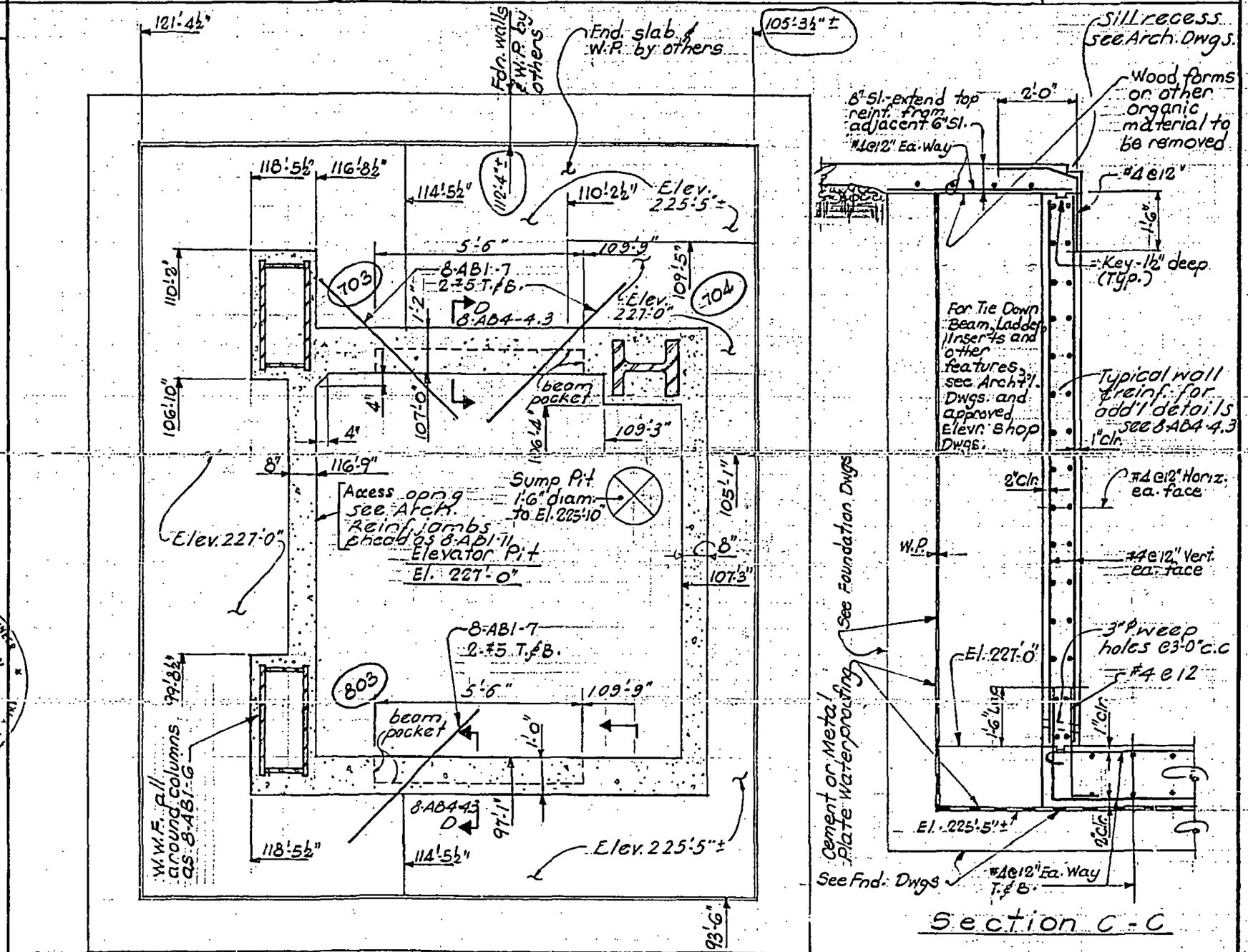
8-AB4-3.2

SKILLING - HELLE - CHRISTIANSEN - ROBERTSON Structural & Civil Enginoors

PROJECT THE WORLD TRADE CENTER | TITLE SUB-LEVEL #5, ELEVATOR PITS | DATE 5-1-68

REVISIONS

12-18-68



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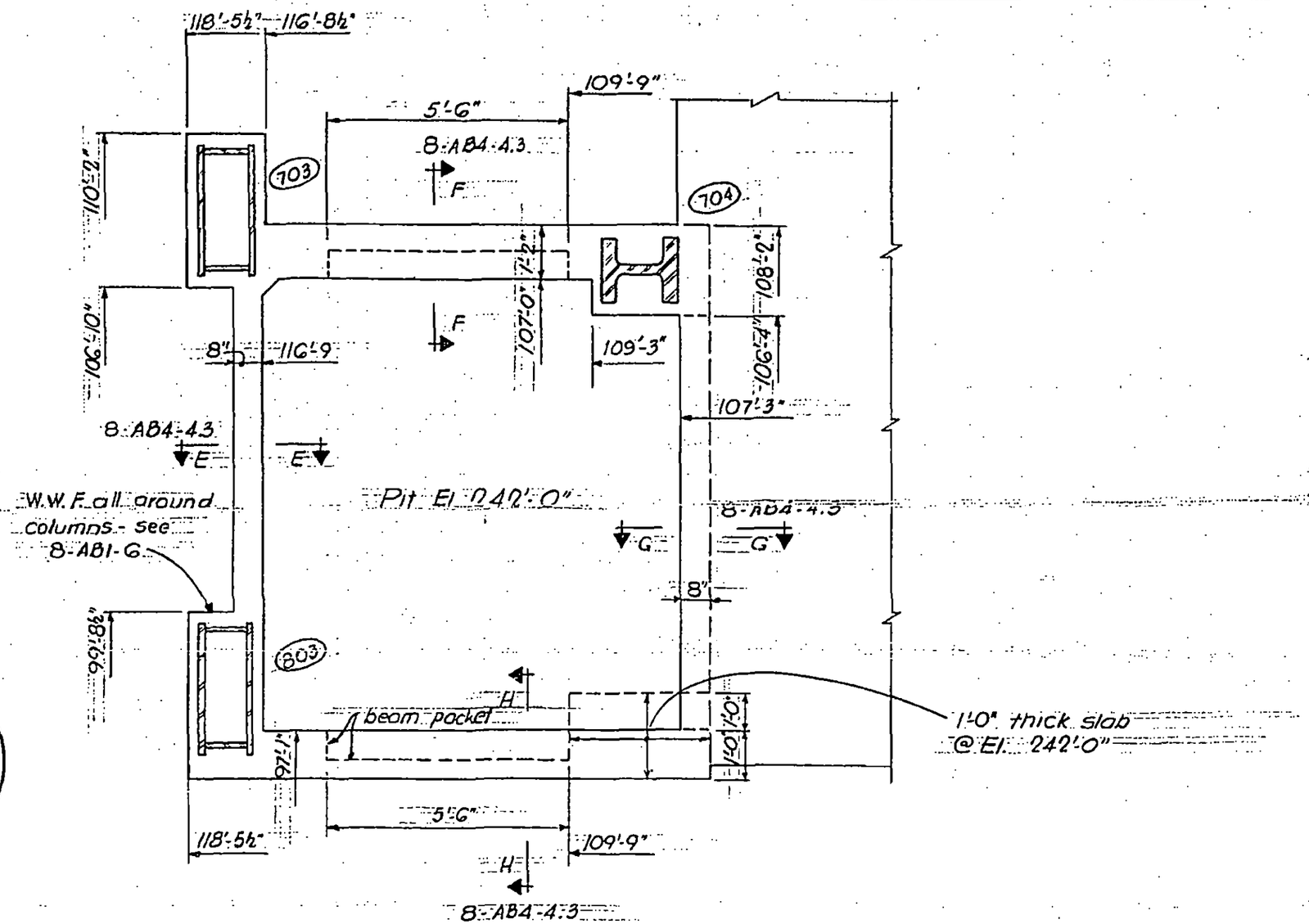
UNIVERSITY OF THE STATE OF NEW YORK

8-AB4-4.1

SKILLING - HELLE - CHRISTIANSEN - ROBERTSON Structural & Civil Engineers

PROJECT THE WORLD TRADE CENTER | TITLE SUB-LEVEL #5 - ELEVATOR PITS | DATE 5-1-68

REVISIONS



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Detail B

Elevator Pit - Tower B

8-AB4-4.2

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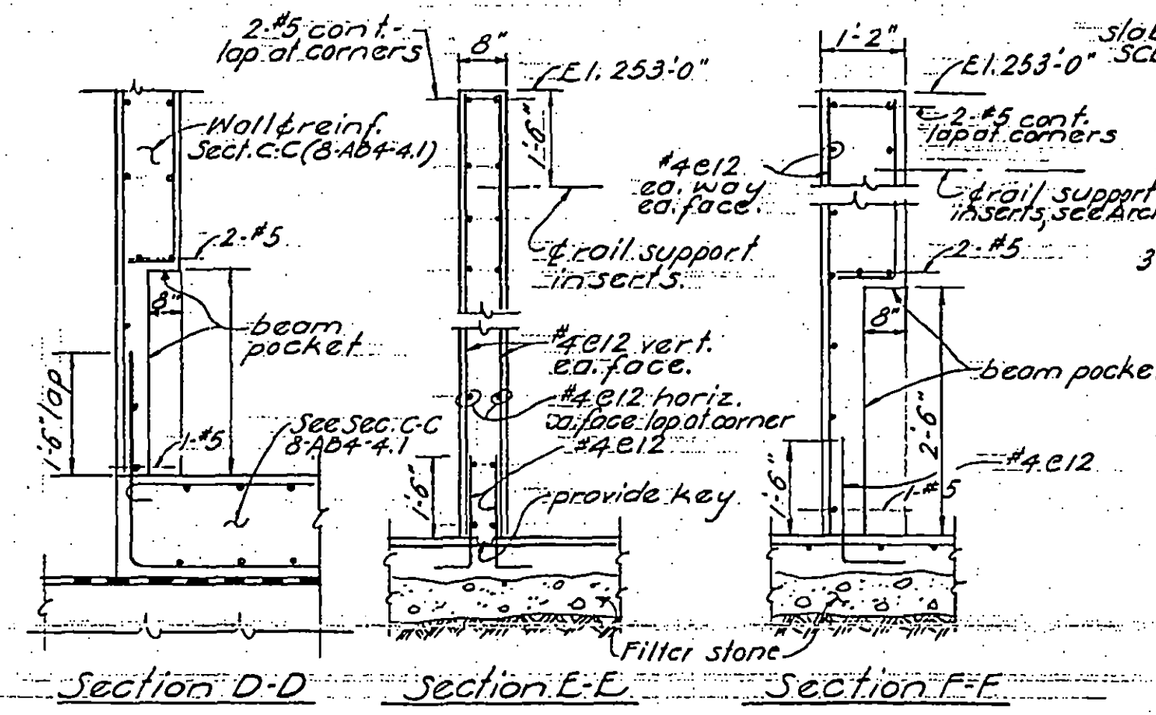
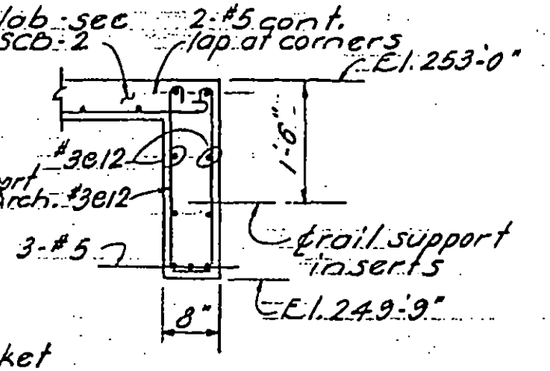
PROJECT THE WORLD TRADE CENTER | TITLE SUB-LEVEL #5 - ELEVATOR PITS | DATE 5-1-68

REVISIONS

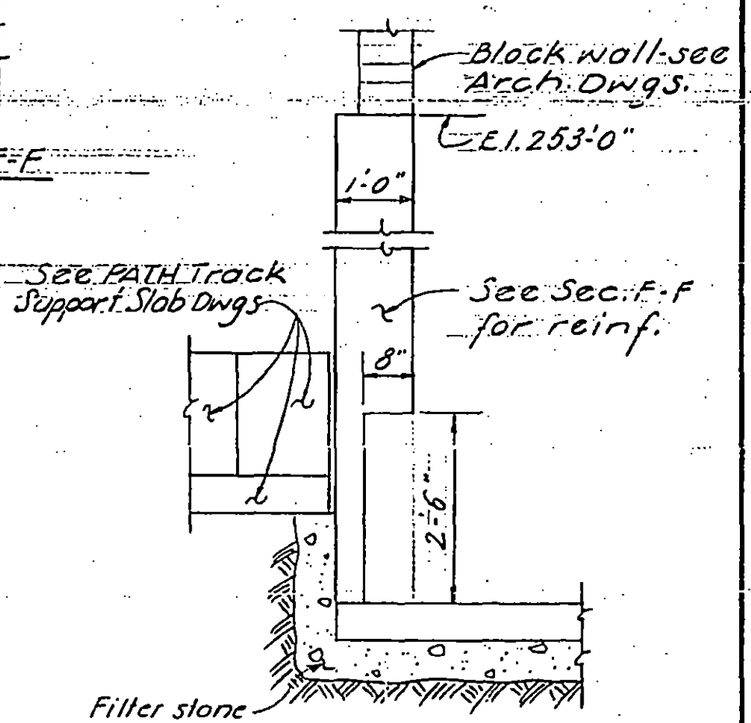


Section D-D Section E-E

Section F-F



Section G-G



Section H-H

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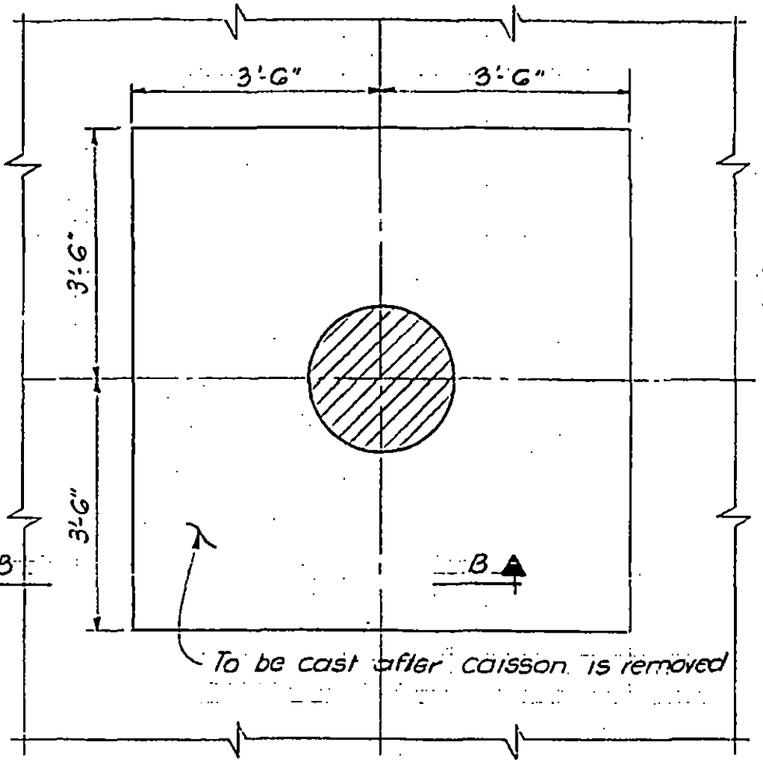
8-AB4-4.3

SKILLING - HELLE - CHRISTIANSEN - ROBERTSON Structural & Civil Engineers

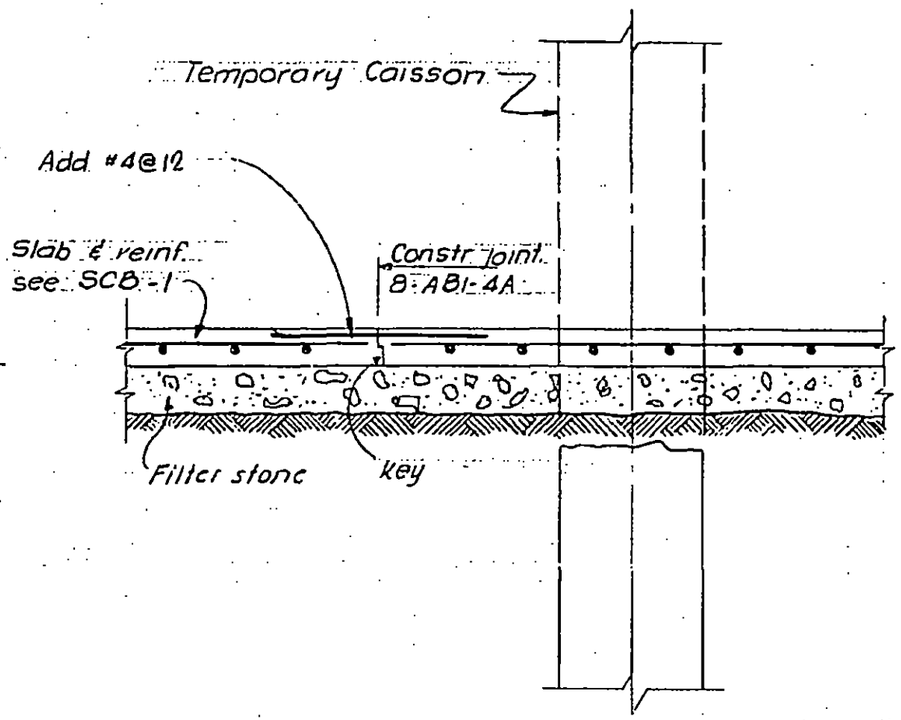
PROJECT THE WORLD TRADE CENTER | TITLE SUB-LEVEL #5 — DETAILS AT CAISSONS | DATE 5-1-68

REVISIONS



Typical Plan - for variations see S.C.B.-1

Detail A



Section B-B

LICENSED PROFESSIONAL ENGINEER
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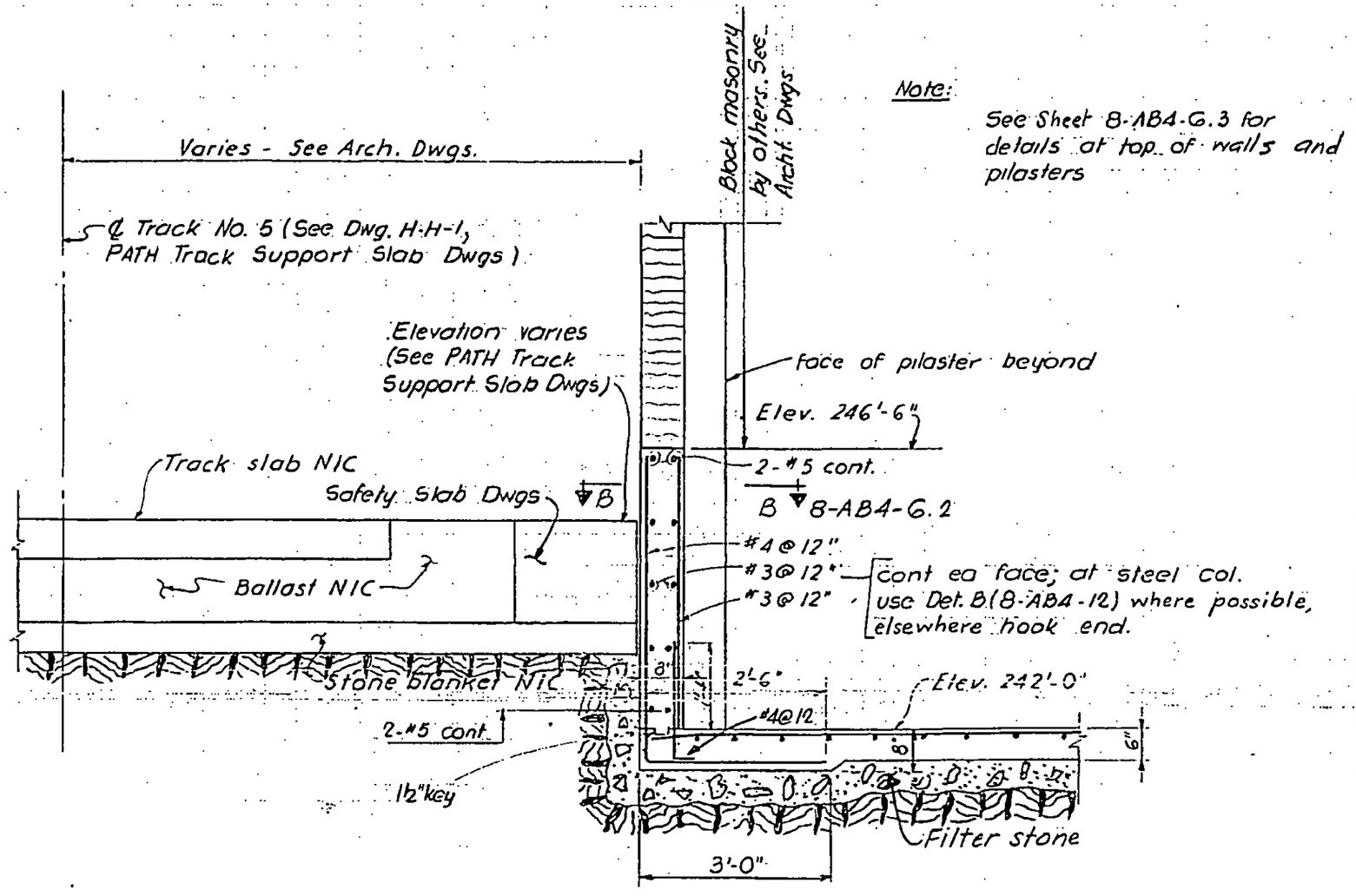
8-AB4-5

SKILLING - HELLE - CHRISTIANSEN - ROBERTSON Structural & Civil Engineers

PROJECT THE WORLD TRADE CENTER | TITLE DETAILS AT PATH TRACKS | DATE 5-1-68

REVISIONS



Section A-A
(typical)

See Dwg 8-AB4-G.2 for details at pilasters

Note:

See Sheet 8-AB4-G.3 for details at top of walls and pilasters

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DETAIL AT PILASTER WALLS - TOWER B

8-AB4-G.1

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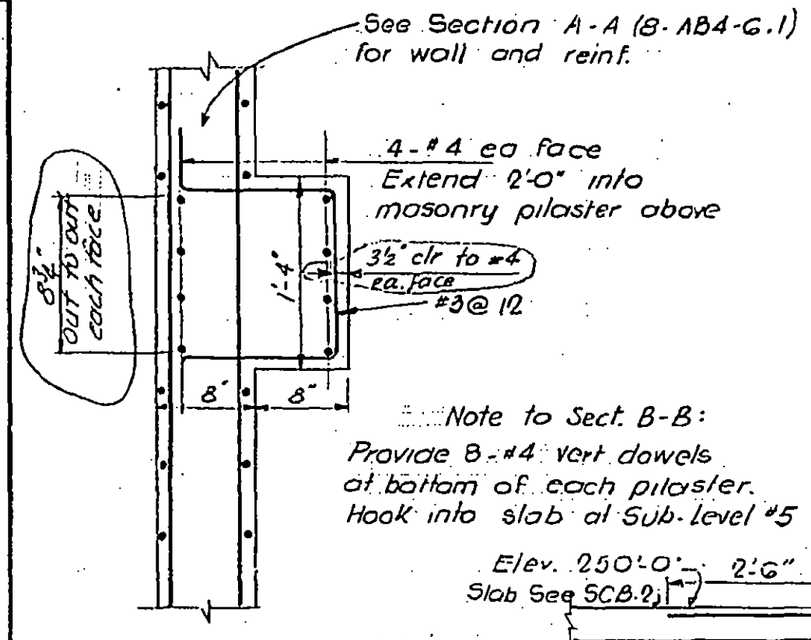
PROJECT THE WORLD TRADE CENTER | TITLE SUB-LEVEL #5 - DETAILS AT PATH TRACKS | DATE 5-1-68

REVISIONS

4-11-69

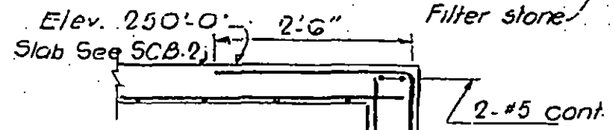
5-9-69

For concrete caps over pilasters see 8-AB4-6E,F.

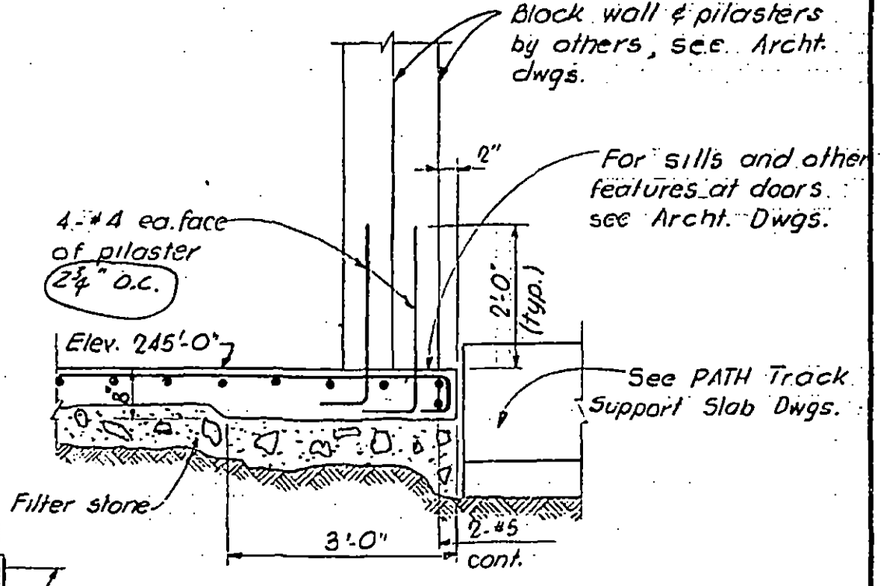


Section B-B

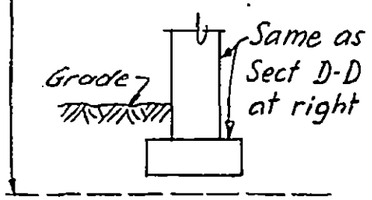
Note to Sect. B-B:
Provide 8-#4 vert dowels at bottom of each pilaster. Hook into slab at Sub-Level #5



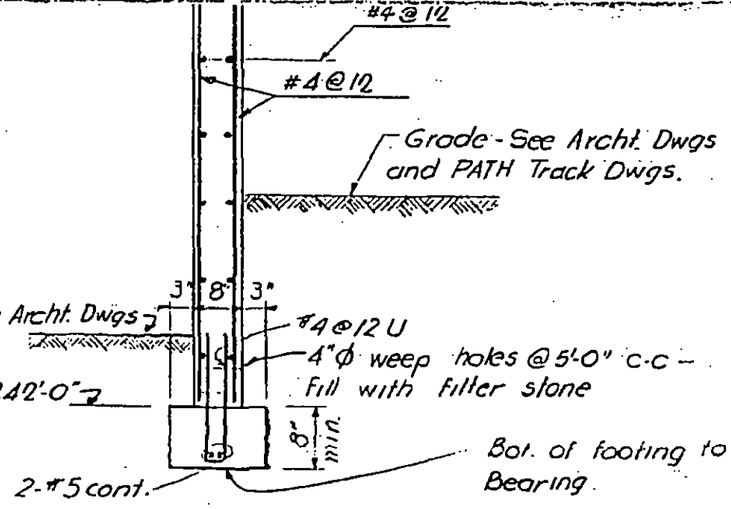
Section C-C



5-9-69



Alternate Section D-D
To be used where ordered by Engineer



Section D-D
(See Alternate this sheet)

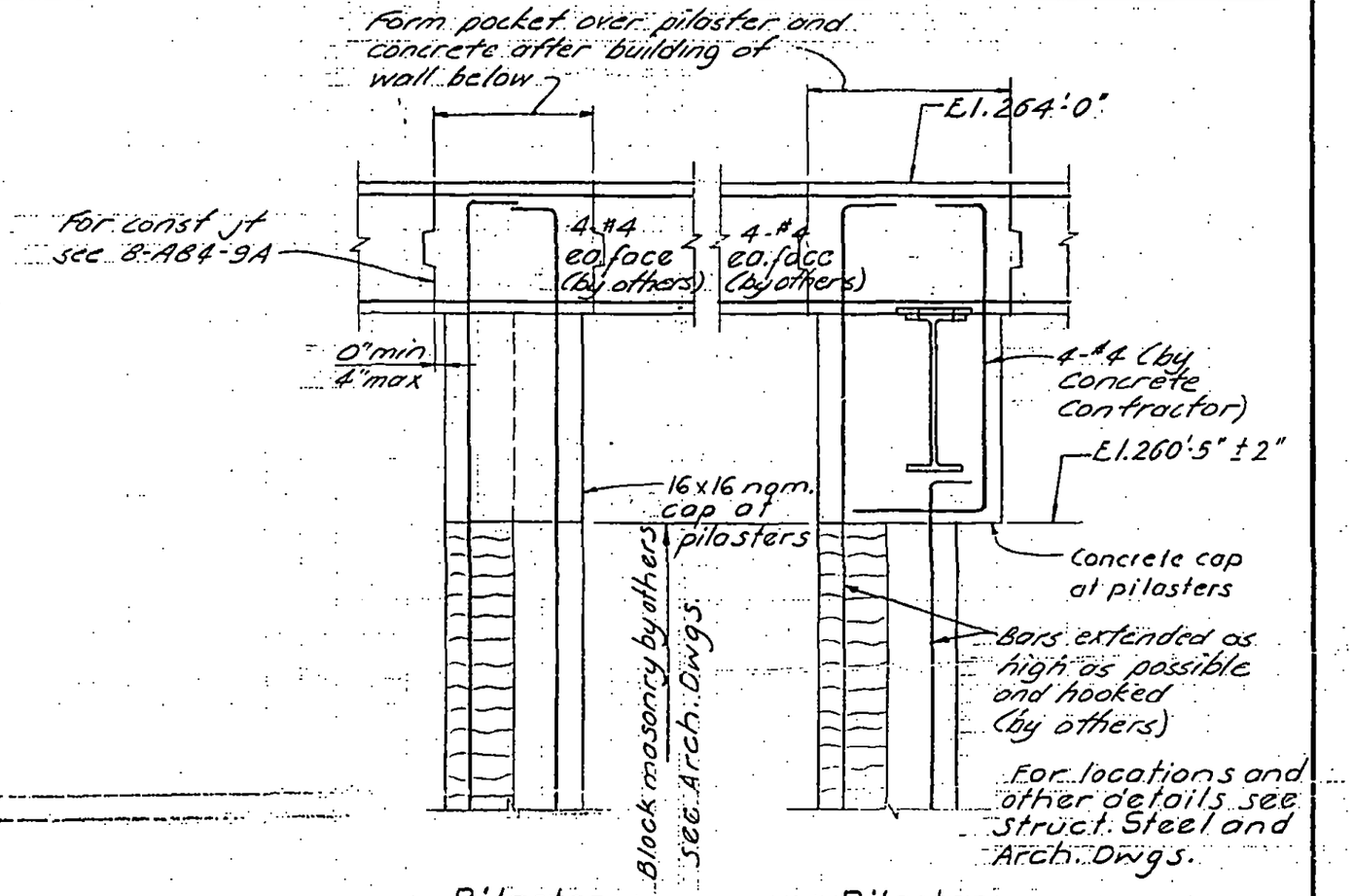
8-AB4-G.2

SKILLING - HELLE - CHRISTIANSEN - ROBERTSON Structural & Civil Engineers

PROJECT THE WORLD TRADE CENTER | TITLE SUB-LEVEL #5 - DETAILS AT PATH TRACKS | DATE 5-1-68

REVISIONS

GENERAL REVISION
5-9-69



Pilaster

No interference.

Detail-E

Pilaster

Steel beam or beams interfere; positions vary. For cases of interference not covered by this detail, contractor to submit details to the Engineer for approval.

Detail-F

DETAILS AT TOP OF PILASTERS

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8-AB4-6.3

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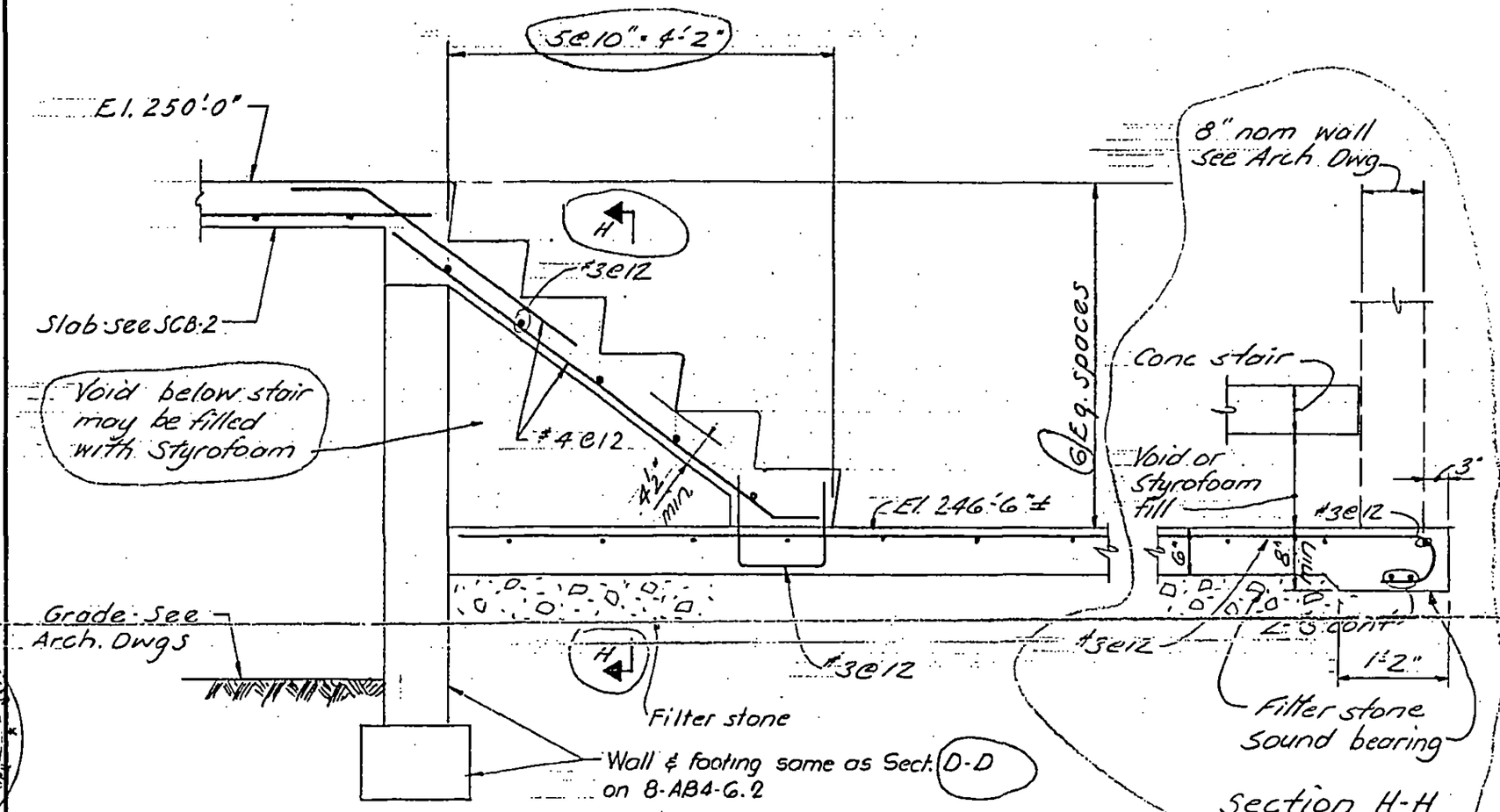
PROJECT THE WORLD TRADE CENTER | TITLE DETAILS AT PATH TRACKS | DATE 5-1-68

REVISIONS

4-11-69



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DIRECTOR OF THE STATE OF NEW YORK

8-AB4-6.4

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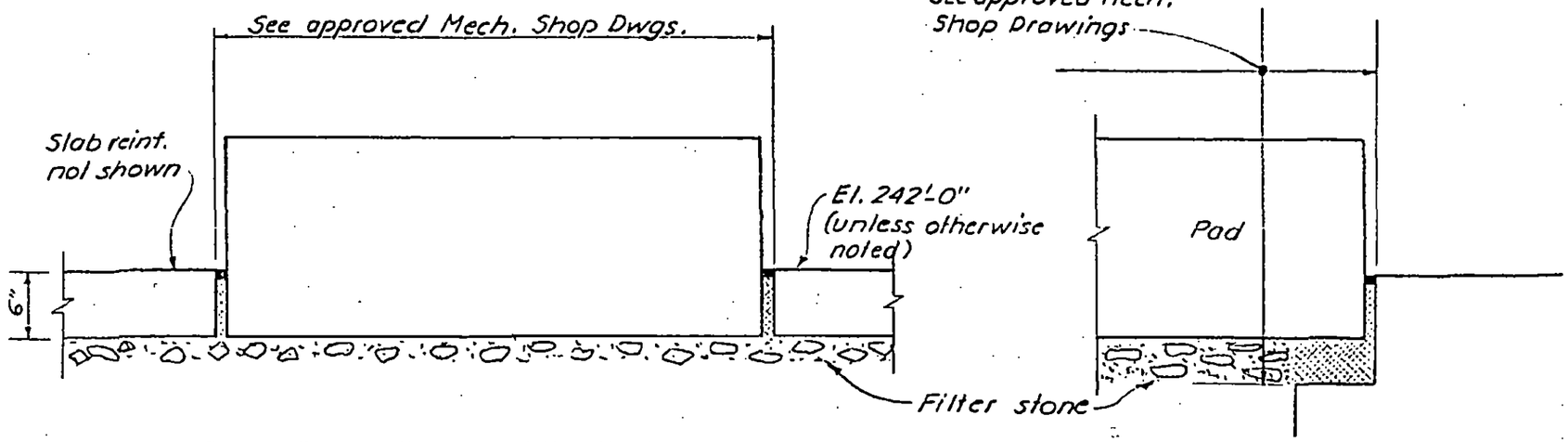
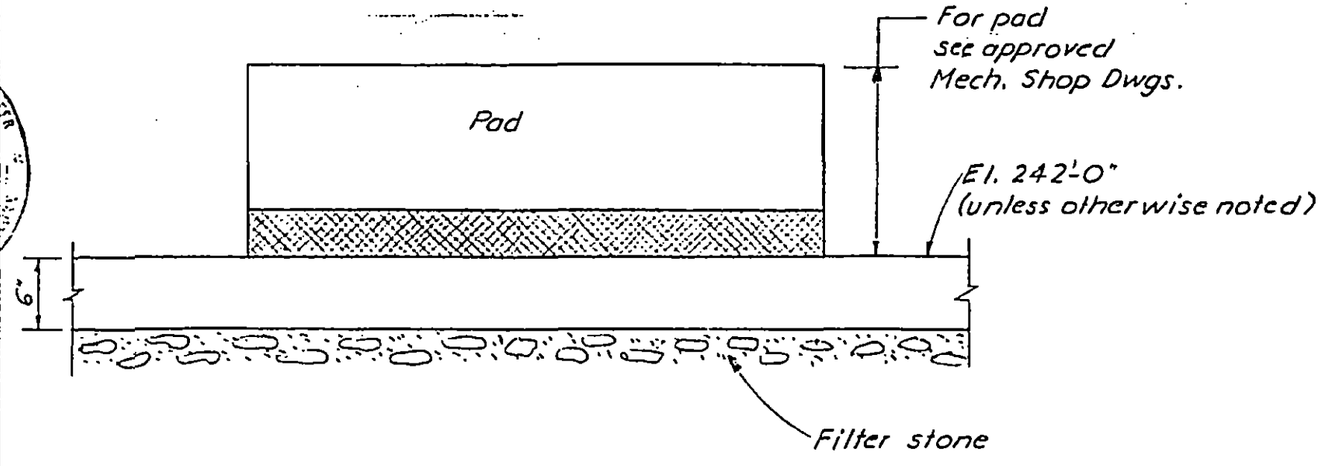
PROJECT THE WORLD TRADE CENTER | TITLE CONCRETE PADS ON GRADE | DATE 5-1-68

REVISIONS



Typical Pad Section A-A

Detail C



Section B-B

LICENSED PROFESSIONAL ENGINEER
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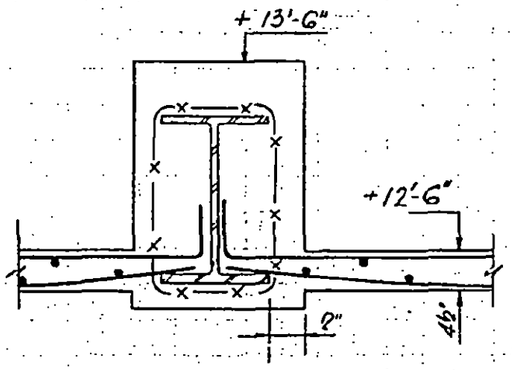
No. 94360
UNIVERSITY OF THE STATE OF

8-AB4-7

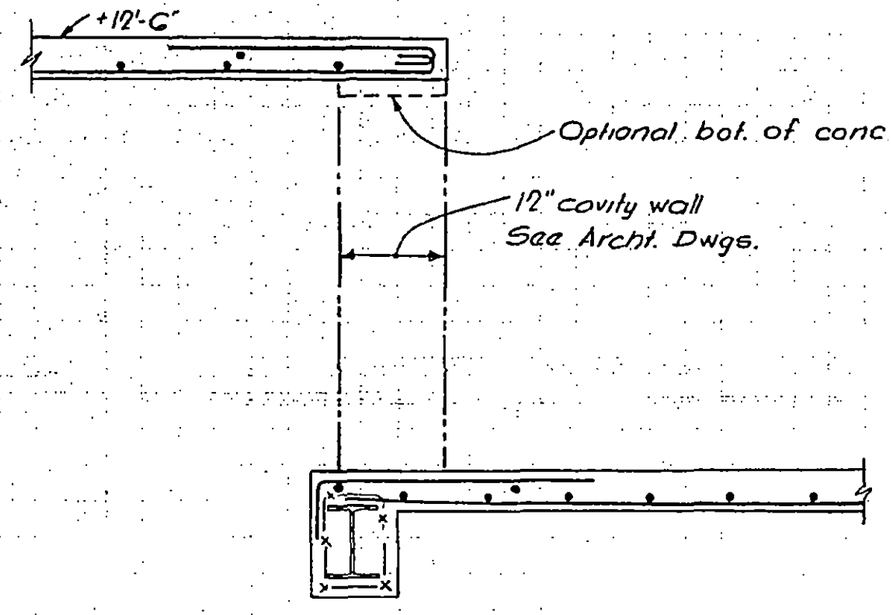
SKILLING - HELLE - CHRISTIANSEN - ROBERTSON Structural & Civil Enginoors

PROJECT THE WORLD TRADE CENTER | TITLE SECTIONS AT SUBLEVEL #4 | DATE 5-1-68

REVISIONS



Section A-A



Section B-B

Note:
For insulation at soffit of slab see Archt. Dwgs & Spec.

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8-AB4-8.1

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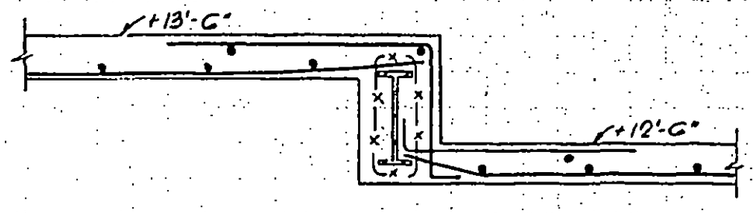
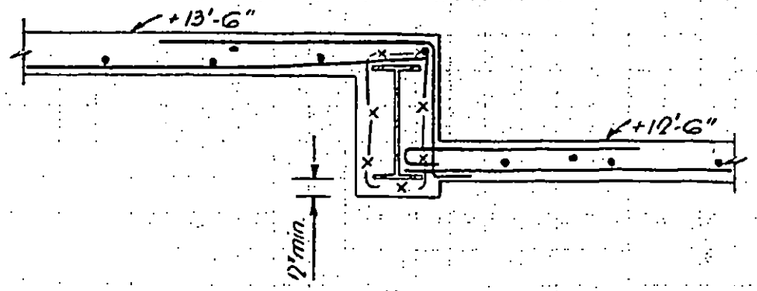
PROJECT THE WORLD TRADE CENTER | TITLE SECTIONS AT SUBLEVEL #4 | DATE 5-1-68

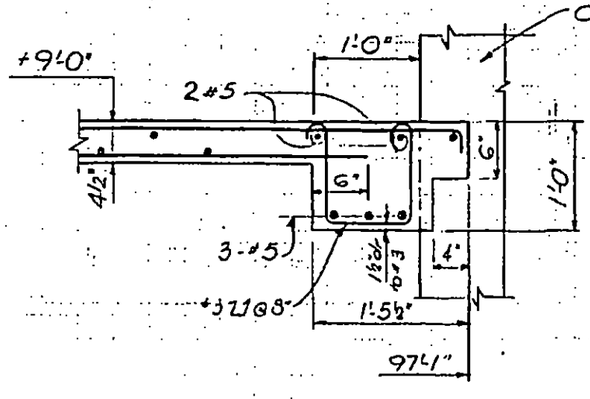
REVISIONS



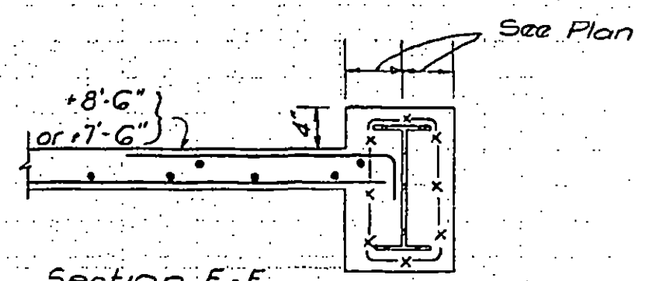
Section C-C



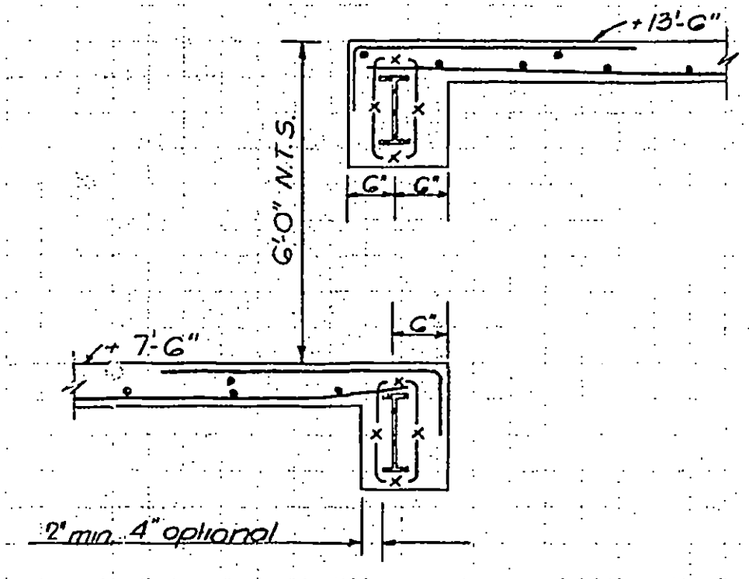
Section D-D



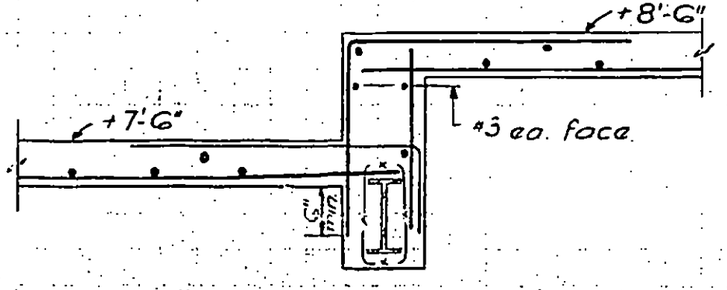
Section H-H



Section E-E



Section F-F



Section G-G

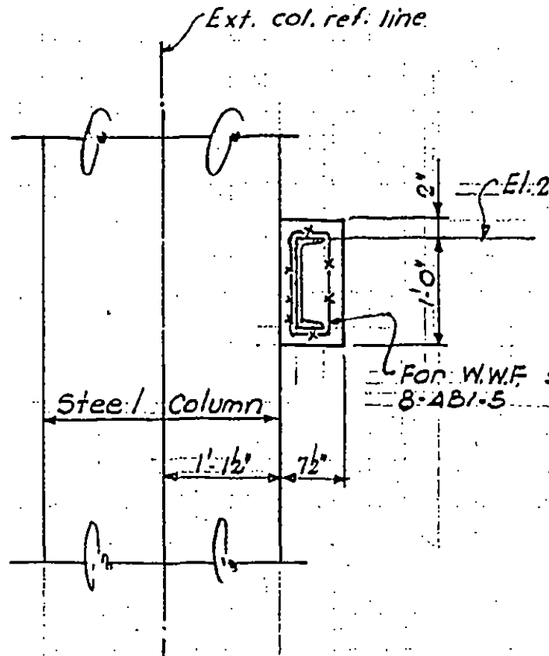
8-AB4-8.2

LICENSED PROFESSIONAL ENGINEER LESLIE E. ROBERTSON No. 84360 STATE OF NEW YORK UNIVERSITY OF THE STATE OF NEW YORK

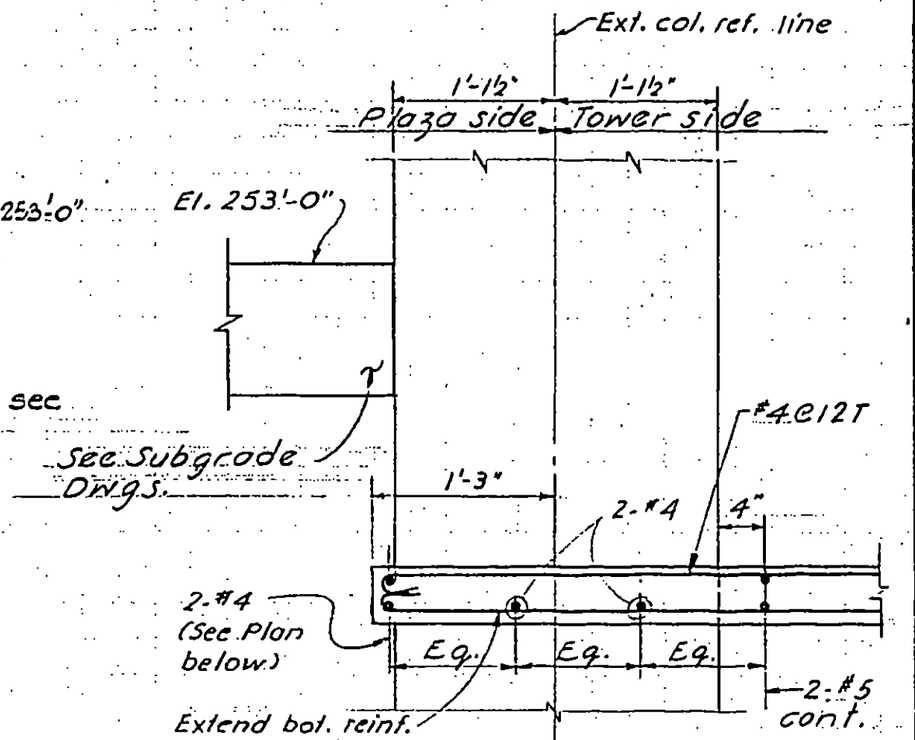
SKILLING - HELLE - CHRISTIANSEN - ROBERTSON Structural & Civil Engineers

PROJECT THE WORLD TRADE CENTER | TITLE SECTIONS AT SUB-LEVEL #4, EL. 253' | DATE 5-1-68

REVISIONS



Section K-K



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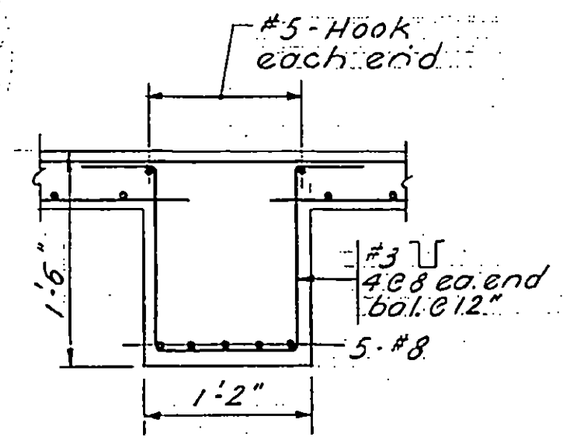
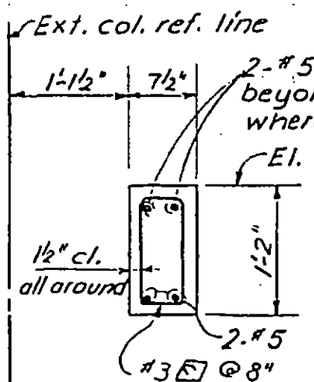
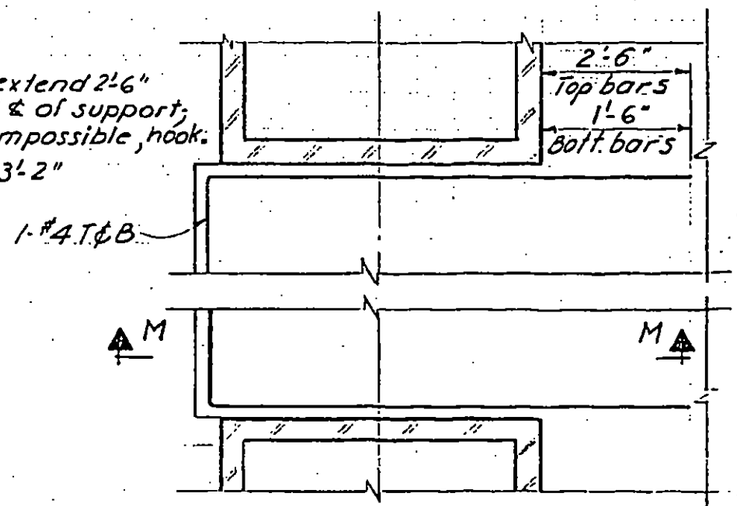


Section N-N



Section L-L



Plan

8-AB4-83

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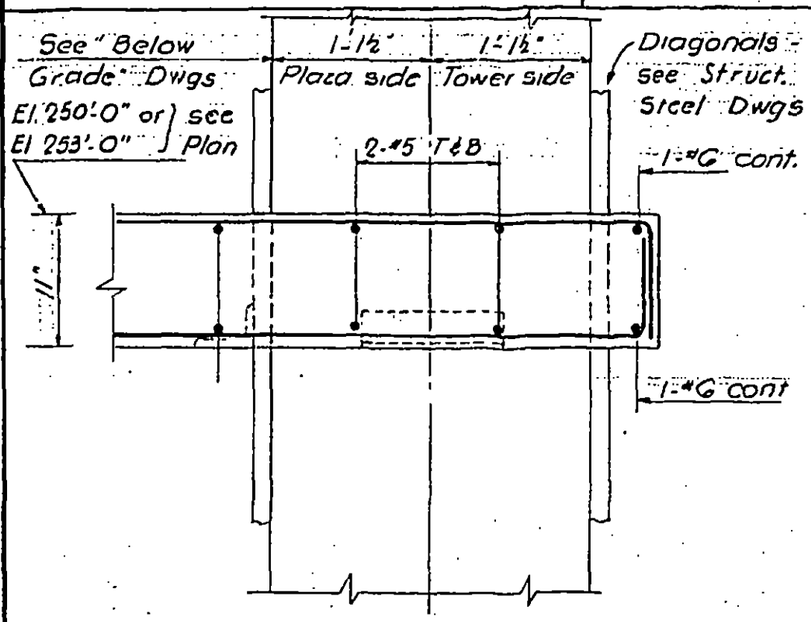
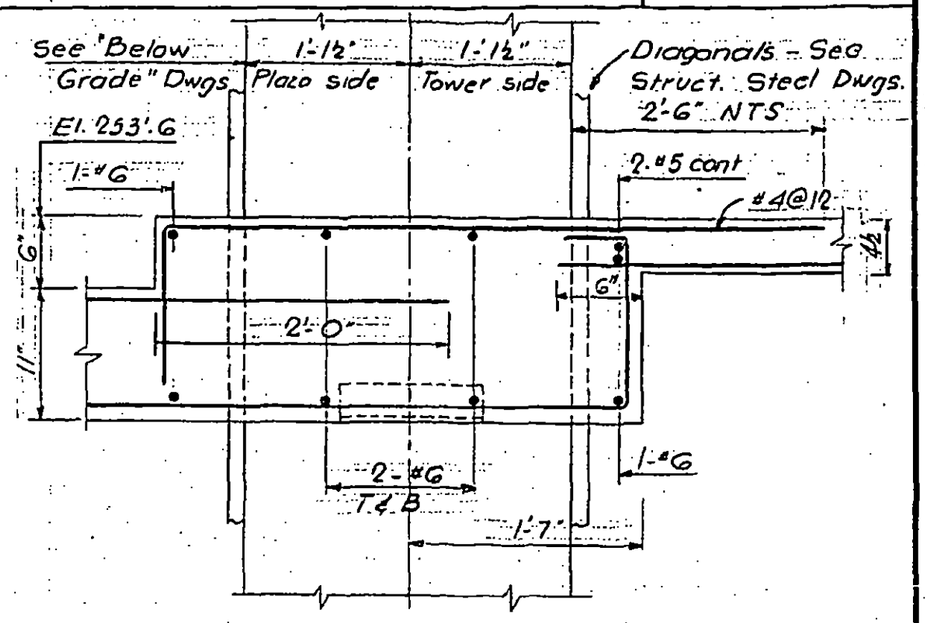
PROJECT THE WORLD TRADE CENTER | TITLE SECTIONS AT SUBLEVEL #4 | DATE 5-1-68

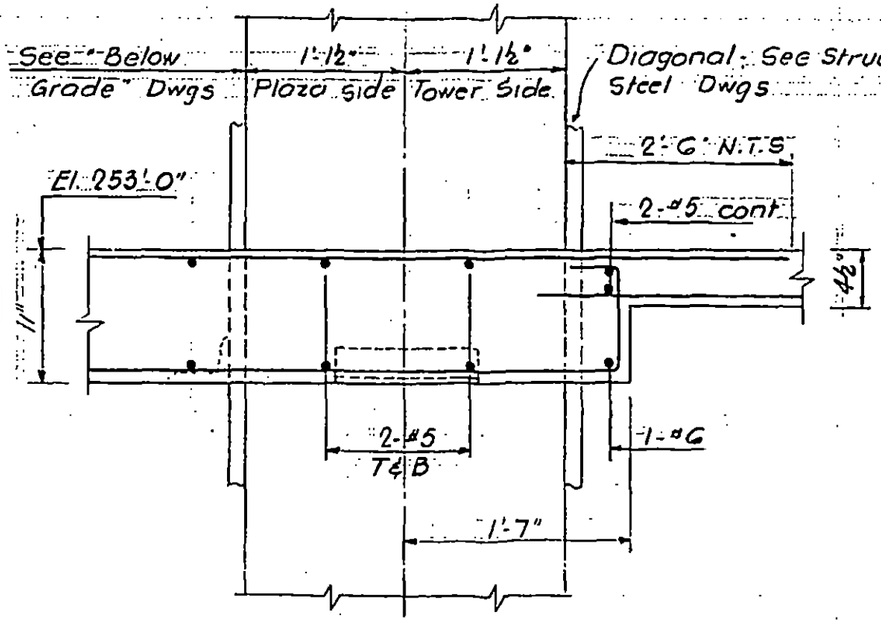
REVISIONS



Section P-P



Section Q-Q



Section R-R

Note:

Replace any reinforcing bars interrupted by structural steel diagonals or other obstructions with an equal amount of reinforcement placed at the sides of the obstruction. Length and arrangement of bars to be similar to Det. 8-AB1-7B

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8-AB4-8.4

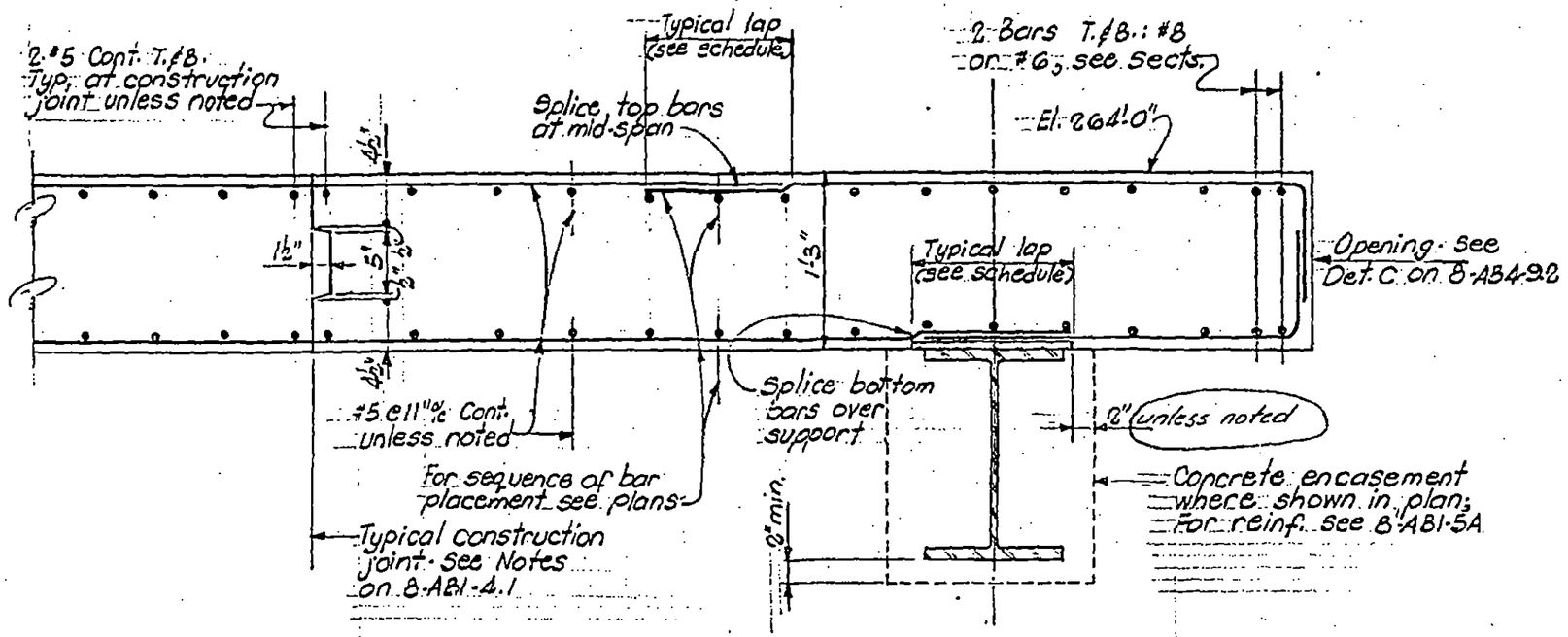
SKILLING, HELLE, CHRISTIANSEN, ROBERTSON — Structural & Civil Engineers

PROJECT: THE WORLD TRADE CENTER | TITLE: TYPICAL DETAILS AT SUB-LEVEL #3, EL. 264' | DATE: 5-1-68

REVISIONS

GENERAL REVISION 1-17-69

5-9-69



SECTION A-A THRU TYPICAL SLAB

NOTES:

1. Sheets 8-AB1 apply to sub-level #3 except as modified.
2. On #5 bars and larger use 90° hooks where possible, regardless of the shape of hook indicated in details.
3. Dowels may be used at construction joints. They shall be equal in size and number to the slab reinforcing bars, and shall overlap them by the length of Typical Lap shown in Schedule.
4. Stagger lap splices. See Note #5 on 8-AB1-2.2.
5. The number of bars given as "T.&B." is to be doubled to obtain the total quantity. See note #11 on 8-AB1-2.2.

LAP SCHEDULE	
2'-3"	for #5
2'-9"	for #6
3'-3"	for #7
3'-6"	for #8
4'-0"	for #9
5'-0"	for #10
6'-0"	for #11

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DRAWN S.T.M.

REVIEWED

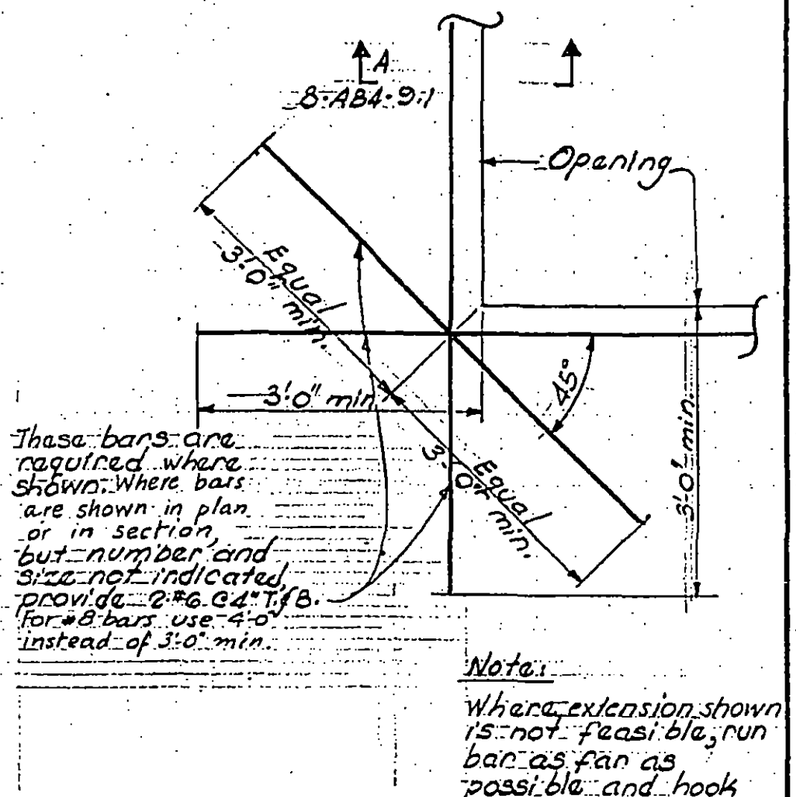
8-AB4-9.1

SKILLING - HELLE - CHRISTIANSEN - ROBERTSON Structural & Civil Engineers

PROJECT THE WORLD TRADE CENTER | TITLE TYPICAL DETAILS AT SUBLEVEL #3, EL. 26.4' | DATE 5-1-68

REVISIONS

1-17-69



Note:

Where extension shown is not feasible, run bar as far as possible and hook end.

Detail C

Typical at Openings Wider Than 18"

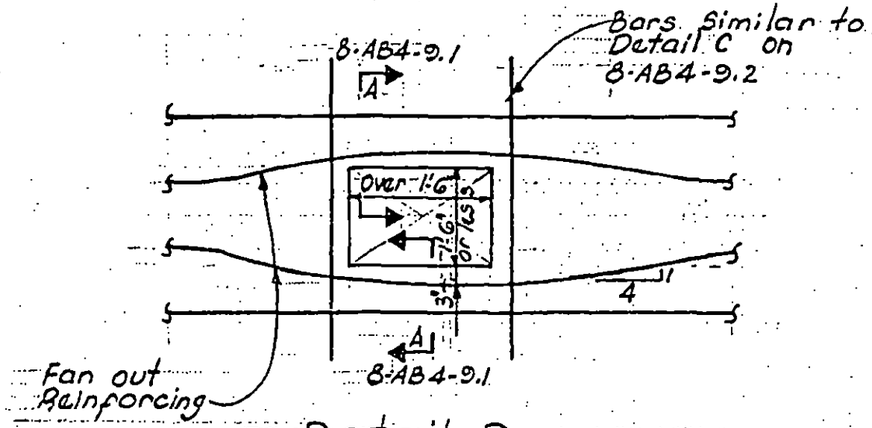
8-AB4-9.2

SKILLING - HELLE - CHRISTIANSEN - ROBERTSON Structural & Civil Engineers

PROJECT THE WORLD TRADE CENTER | TITLE TYPICAL DETAILS AT SUBLEVEL #3, EL. 264' | DATE 5-1-68

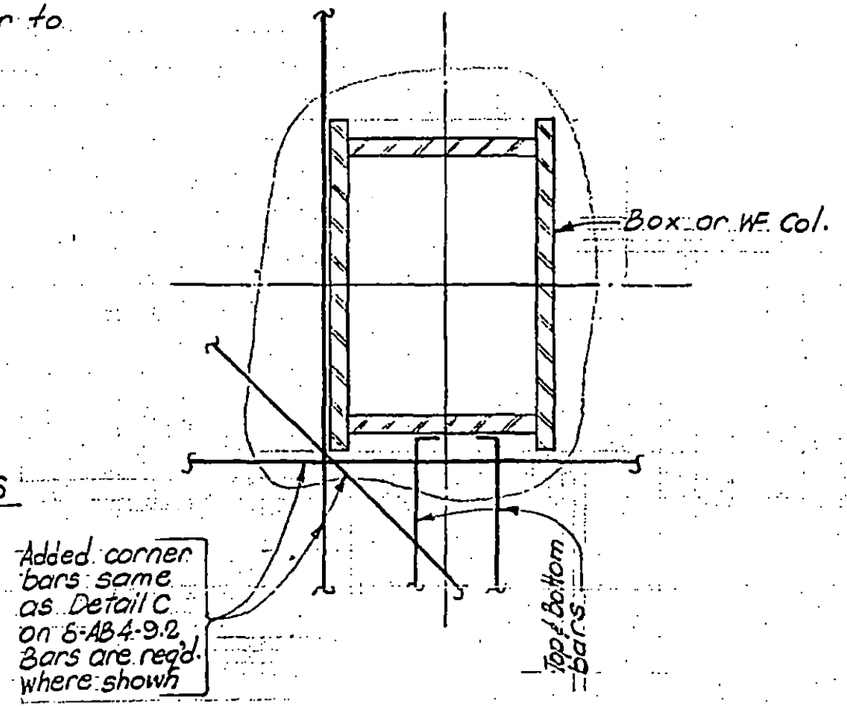
REVISIONS

1-17-69



Detail D

TYPICAL AT OPENING 18" WIDE OR LESS



Detail E

TYPICAL AT COLUMNS

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8-AB4-9.3

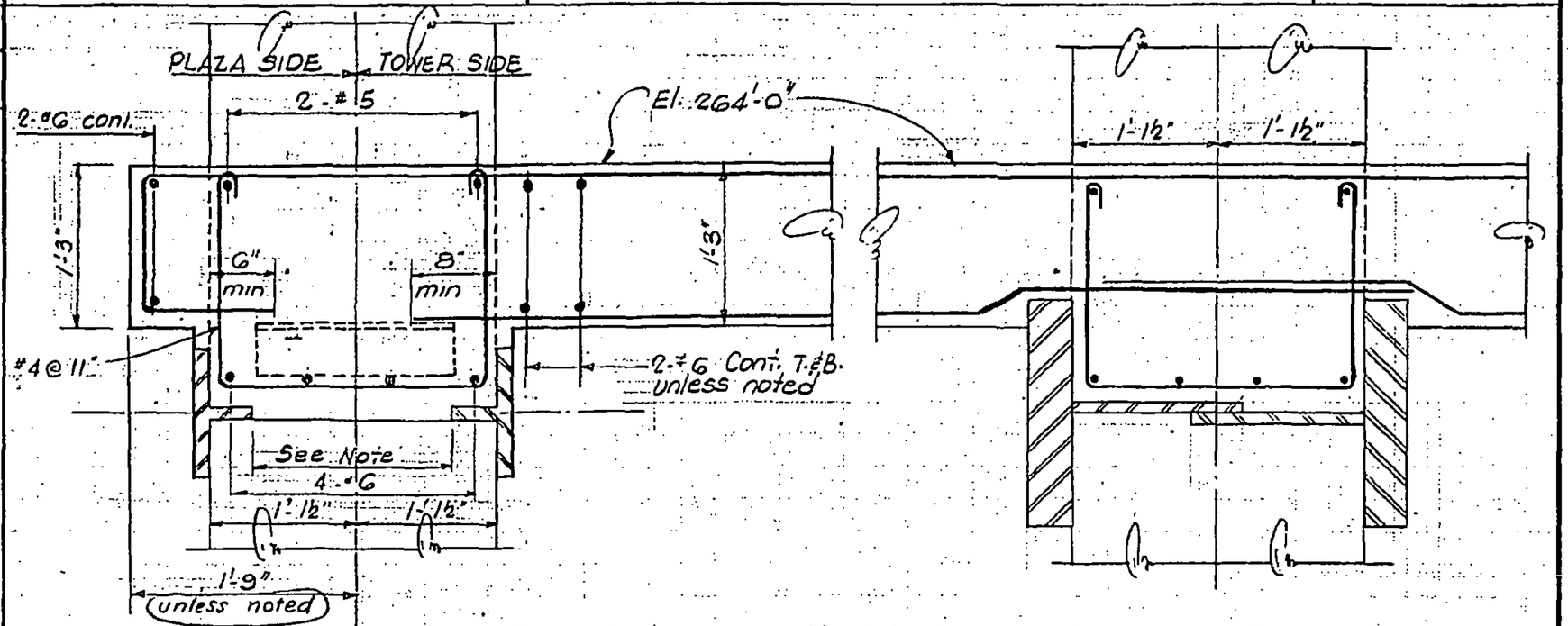
SKILLING - HELLE - CHRISTIANSEN - ROBERTSON Structural & Civil Engineers

PROJECT THE WORLD TRADE CENTER | TITLE SECTIONS AT SUBLEVEL #3 - EL. 264' | DATE 5-1-68

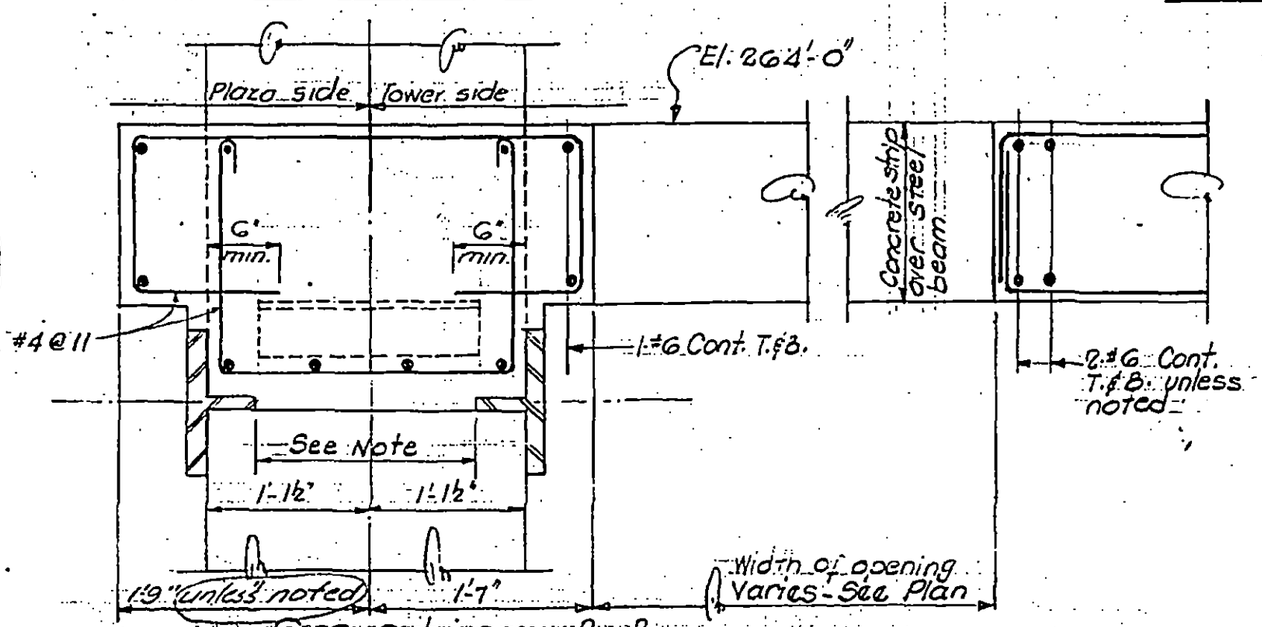
REVISIONS

GENERAL REVISION 1-17-69

5-9-69

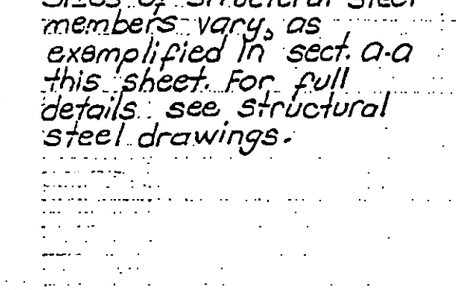


Section A-A



Section B-B

NOTE: Section same as section A-A except as shown



Section a-a

NOTE:
Sizes of structural steel members vary, as exemplified in sect. a-a this sheet. For full details see structural steel drawings.

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8-AB4-10.1

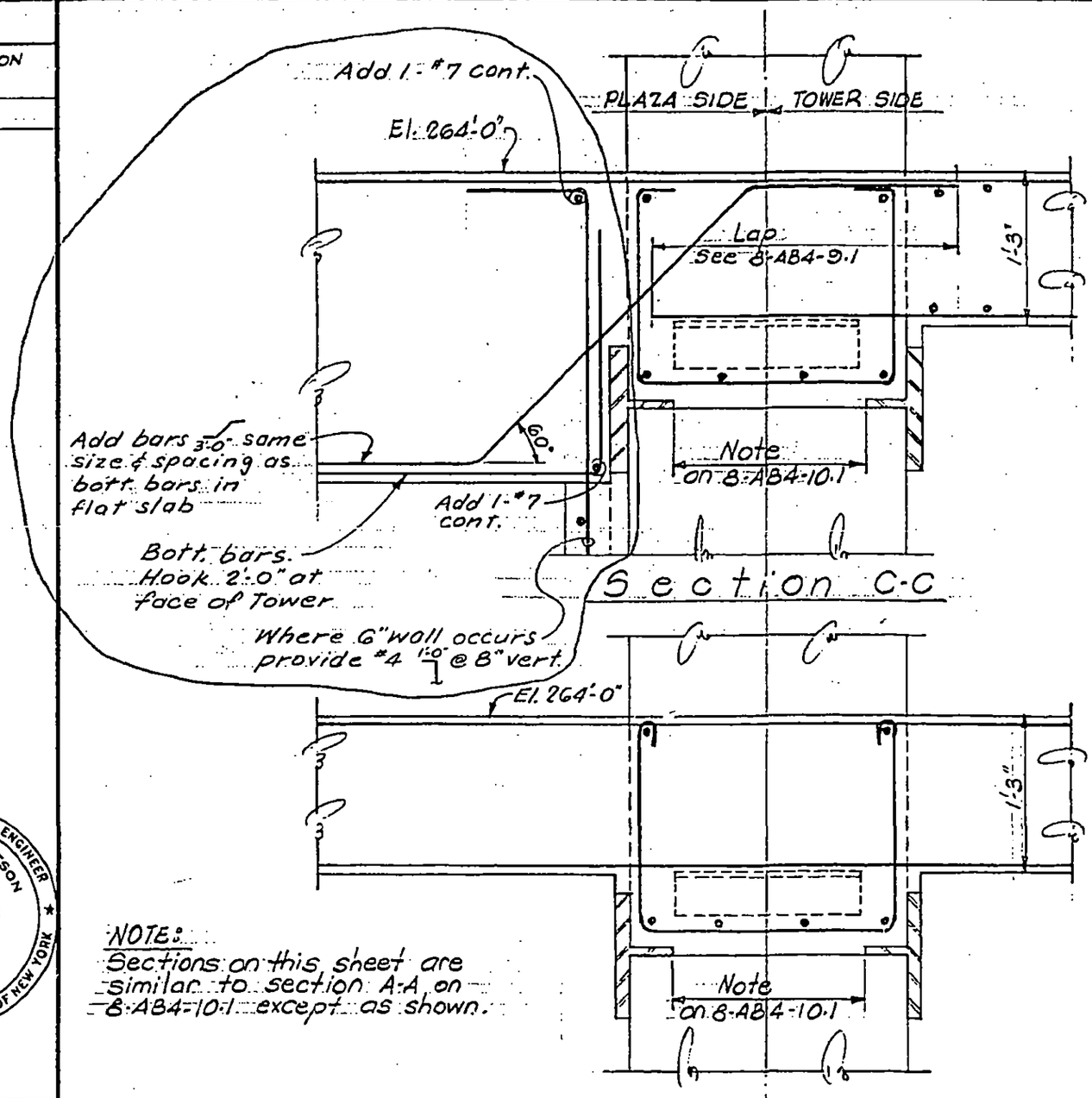
SKILLING, HELLE, CHRISTIANSEN, ROBERTSON — Structural & Civil Engineers

PROJECT THE WORLD TRADE CENTER | TITLE SECTIONS AT SUBLEVEL #3 - EL. 264 | DATE 5-1-68

REVISIONS

GENERAL REVISION 1-17-69

4-9-69



NOTE:
Sections on this sheet are similar to section A-A on 8-AB4-10.1 except as shown.

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DESIGNED

DRAWN S.T.M.

REVIEWED

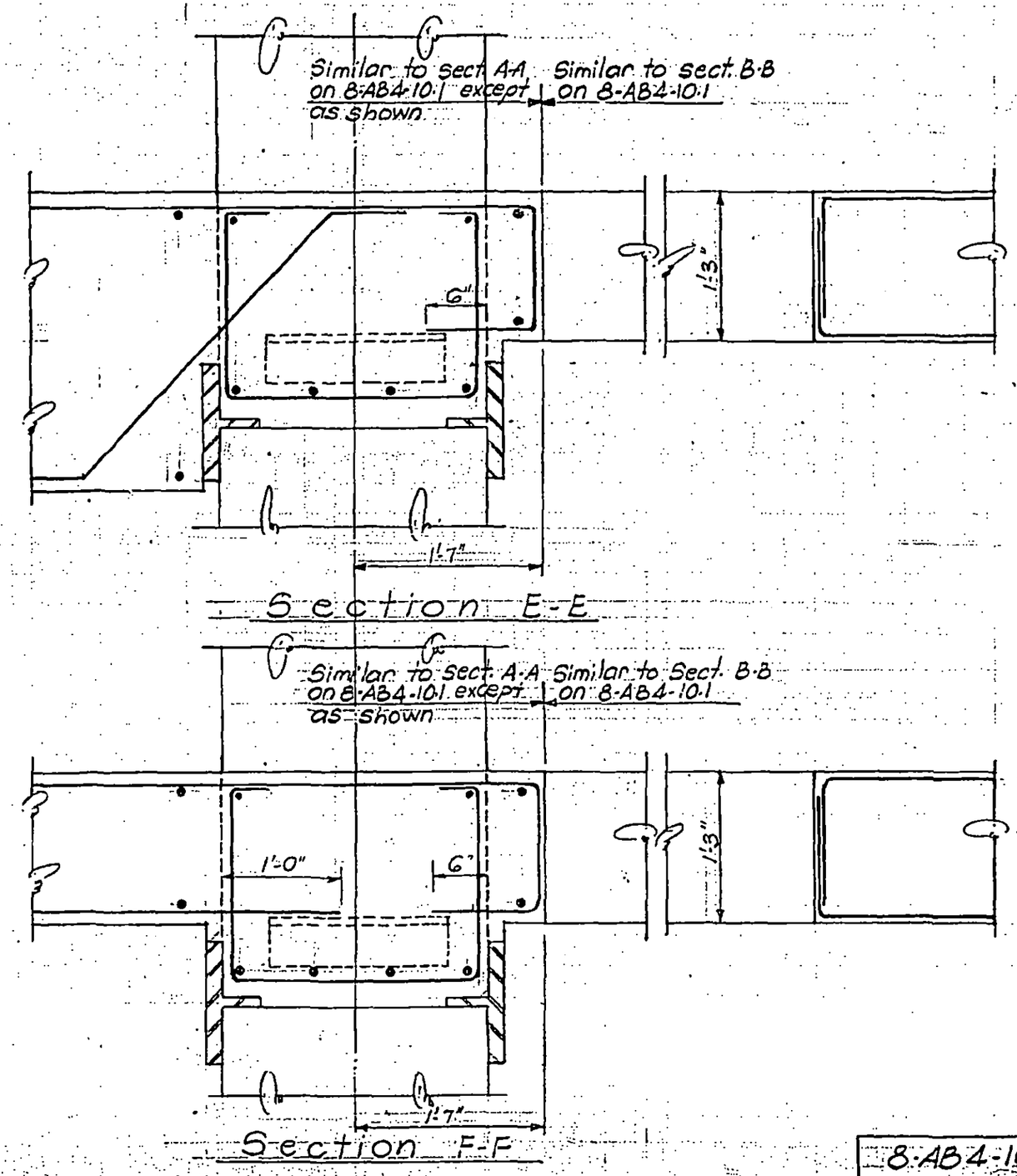
8-AB4-10.2

SKILLING - HELLE - CHRISTIANSEN - ROBERTSON Structural & Civil Engineers

PROJECT THE WORLD TRADE CENTER | TITLE SECTIONS AT SUBLEVEL #3 - EL 264' | DATE 5-1-68

REVISIONS

GENERAL REVISION 1-17-69



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8-AB4-10.3

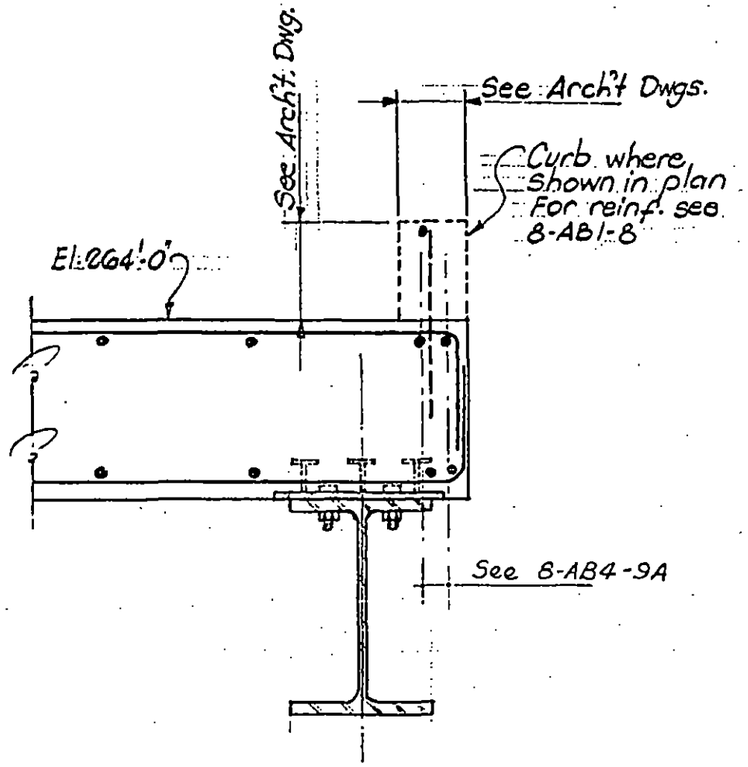
SKILLING, HELLE, CHRISTIANSEN, ROBERTSON — Structural & Civil Engineers

PROJECT: THE WORLD TRADE CENTER | TITLE: SECTIONS AT SUBLEVEL #3 - EL. 264' | DATE: 5-1-68

REVISIONS

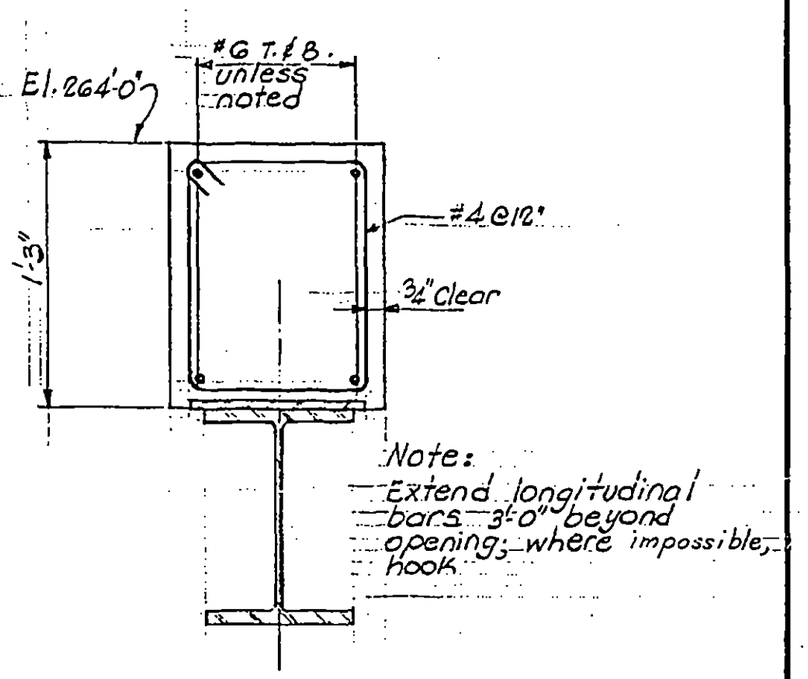
GENERAL REVISION 1-17-69

8-5-69



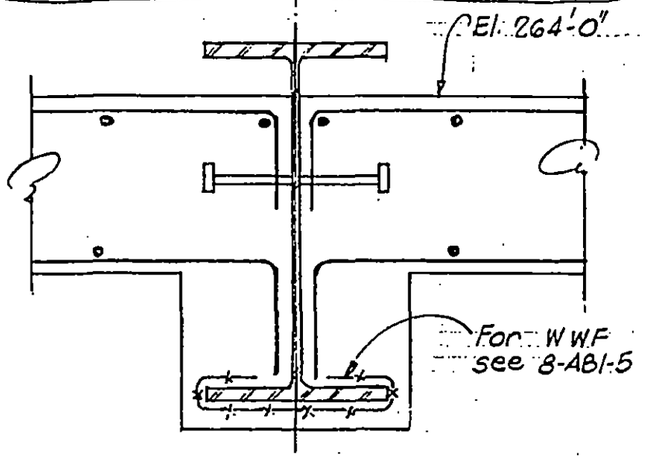
Section G-G

Similar to 8-AB4-9A except as shown



Note: Extend longitudinal bars 3'-0" beyond opening; where impossible, hook

Section J-J



Section H-H

Similar to 8-AB4-9A except as shown

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DESIGNED

DRAWN S.T.M.

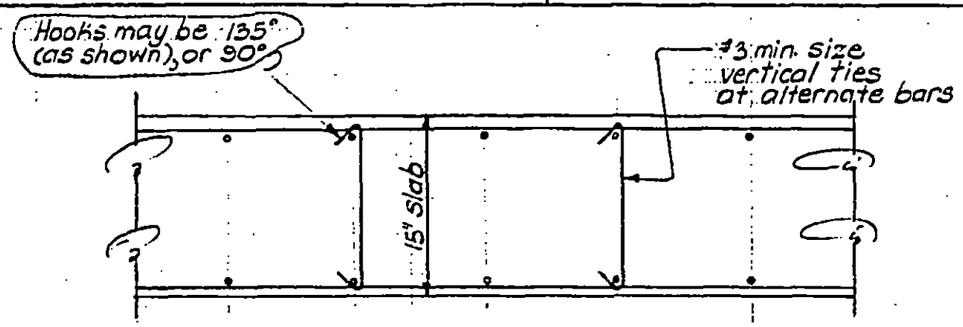
REVIEWED W. A. Brewer

8-AB4-10.4

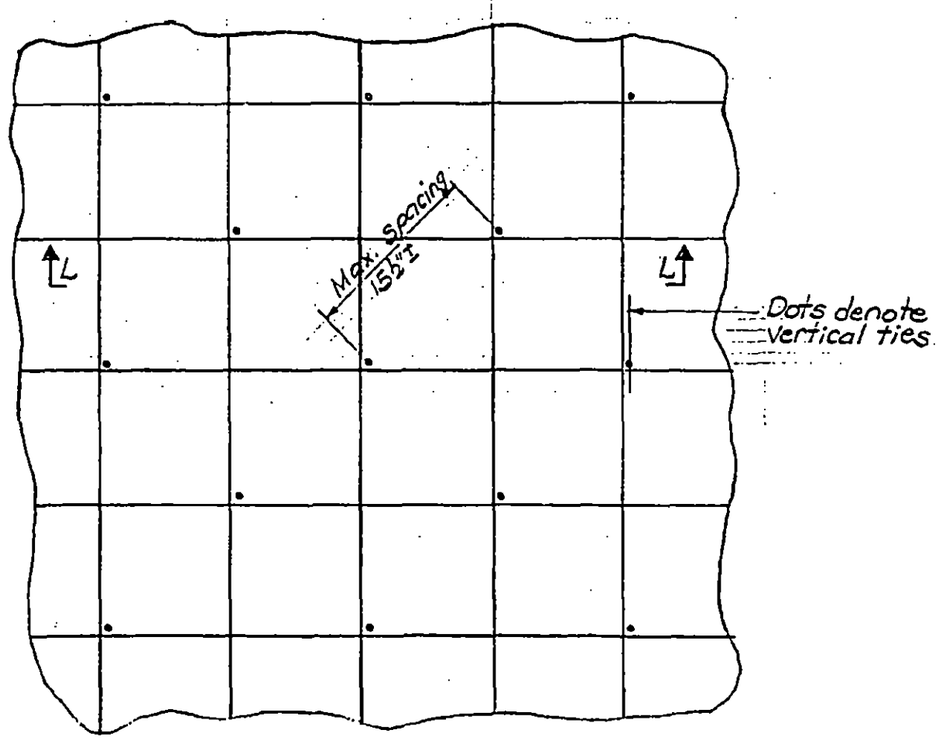
SKILLING, HELLE, CHRISTIANSEN, ROBERTSON — Structural & Civil Engineers

PROJECT THE WORLD TRADE CENTER | TITLE SECTIONS AT SUB-LEVEL #3, EL. 264' | DATE 1-17-69

REVISIONS
1-17-69
1-22-69



Section L-L



PLAN
Detail K

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No. 34360
UNIVERSITY OF THE STATE OF NEW YORK

DESIGNED
DRAWN S.T.M.
REVIEWED

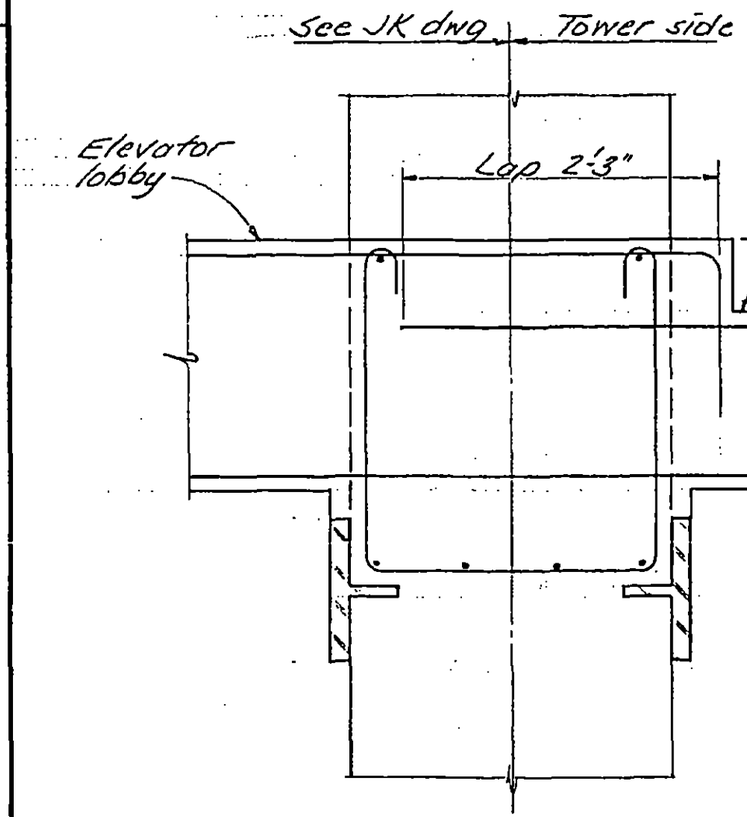
8-AB4-10.5

SKILLING, HELLE, CHRISTIANSEN, ROBERTSON, Structural & Civil Engineers

PROJECT THE WORLD TRADE CENTER | TITLE SECTIONS AT SUBLEVEL #3 - EL 264'-0" | DATE 4-25-69

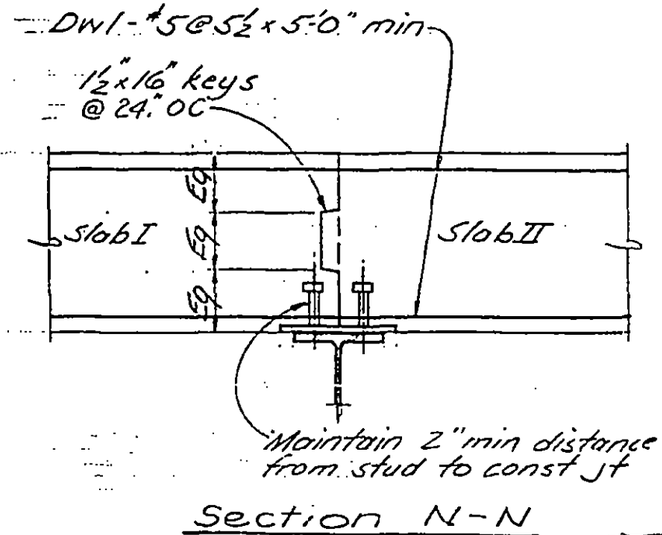
REVISIONS

8-5-69



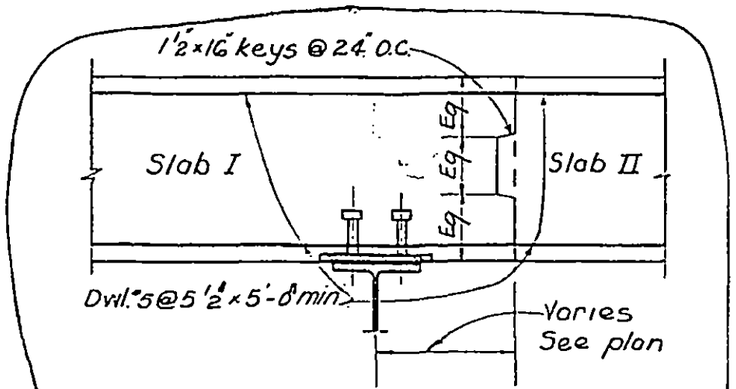
Section M-M

Similar to Sect A-A on 8-AB4-10.1 except as shown



Section N-N

Similar to 8-AB4-9A except as shown



Section N'-N'

Similar to 8-AB4-9A except as shown

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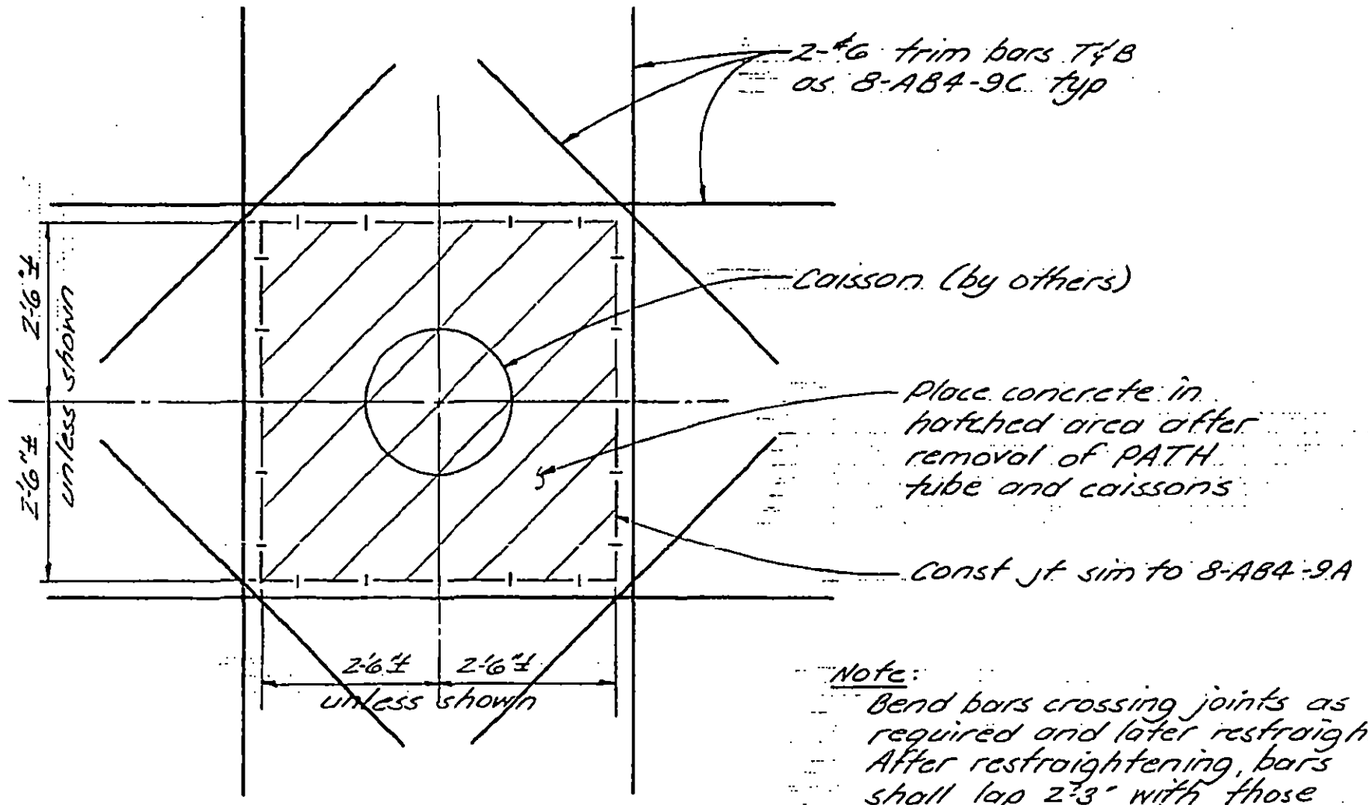
8-AB4-10.6

SKILLING, HELLE, CHRISTIANSEN, ROBERTSON — Structural & Civil Engineers

PROJECT: THE WORLD TRADE CENTER | TITLE: DETAIL AT SUBLEVEL #3 - EL 264' | DATE: 6-3-69

REVISIONS

8-5-69



Detail Plan P

(Tower B only)

Note:
Bend bars crossing joints as required and later restraighten. After restraightening, bars shall lap 2'-3" with those from the opposite side.

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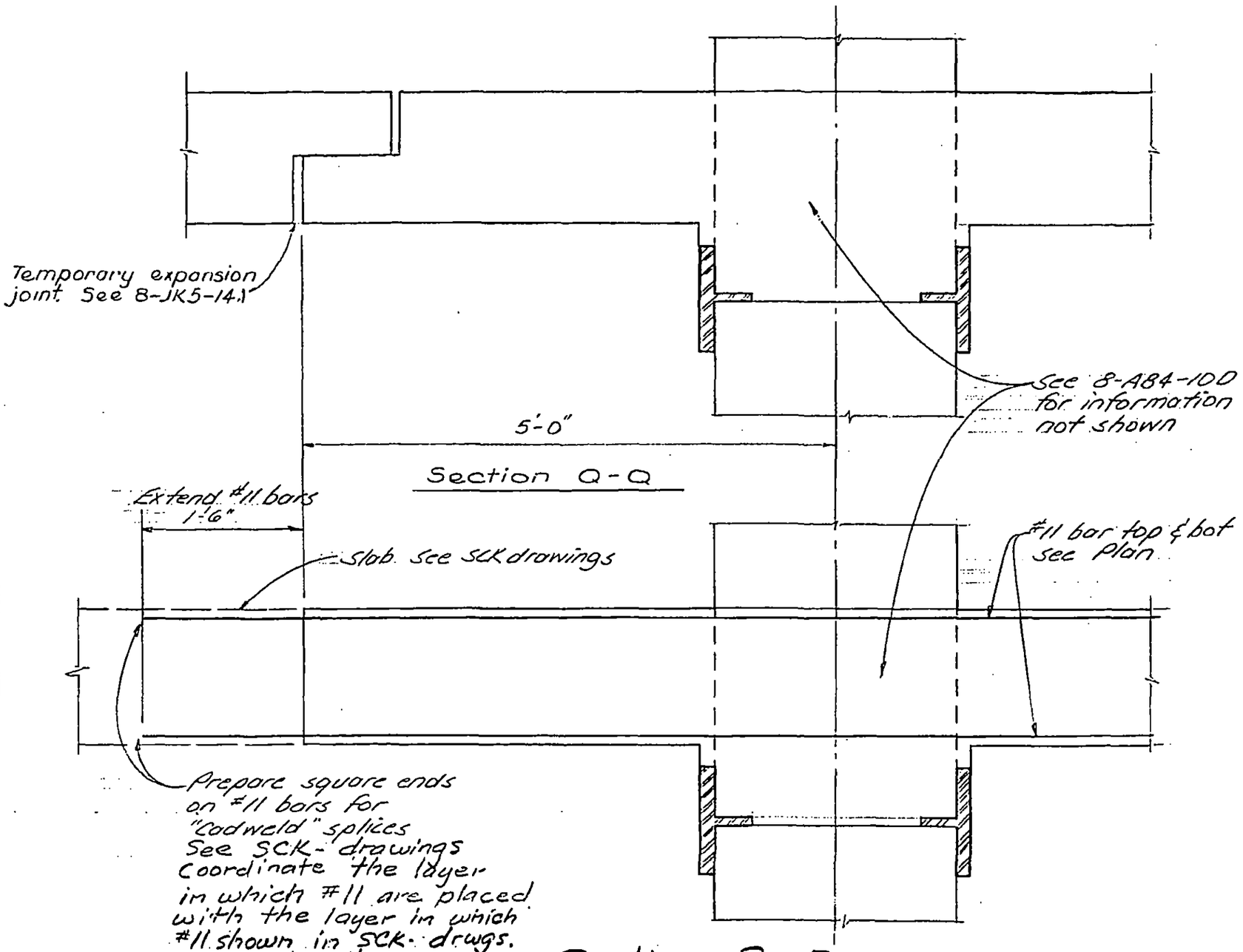
REVIEWED W. A. Brewer

8-AB4-10.7

SKILLING, HELLE, CHRISTIANSEN, ROBERTSON — Structural & Civil Engineers

PROJECT THE WORLD TRADE CENTER | TITLE SECTION AT SUBLEVEL # 3-EL 264 | DATE 8-5-69

REVISIONS



DESIGNED

DRAWN D.C.H

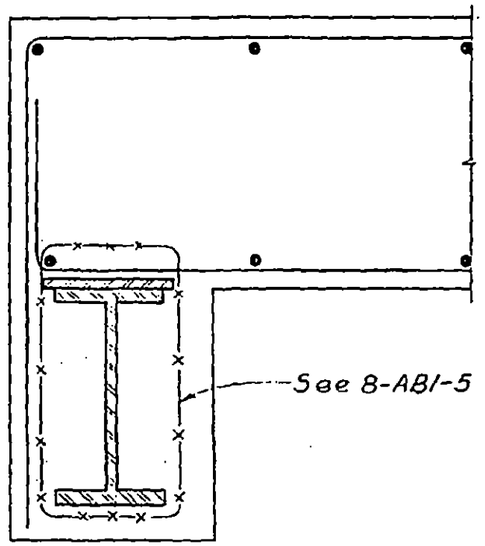
REVIEWED W.A. Brewer

8-AB4-10.8

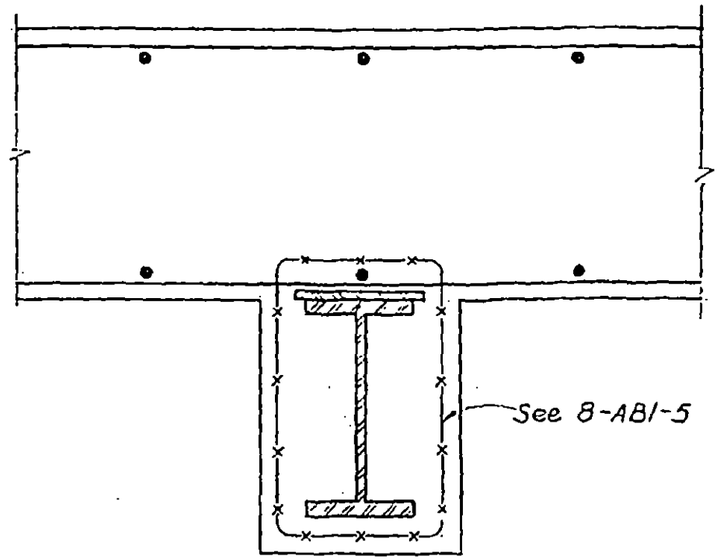
SKILLING, HELLE, CHRISTIANSEN, ROBERTSON — Structural & Civil Engineers

PROJECT THE WORLD TRADE CENTER | TITLE SECTIONS AT SUBLEVEL # 3-EL 264 | DATE 8-5-69

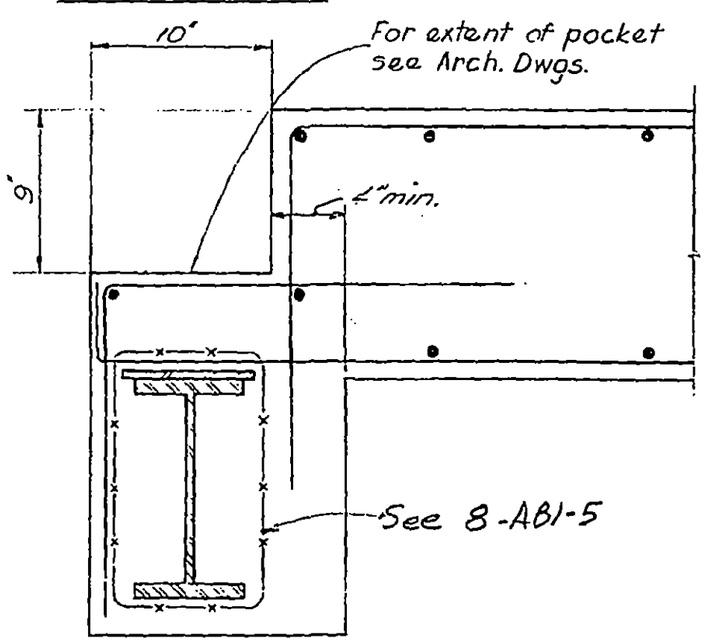
REVISIONS



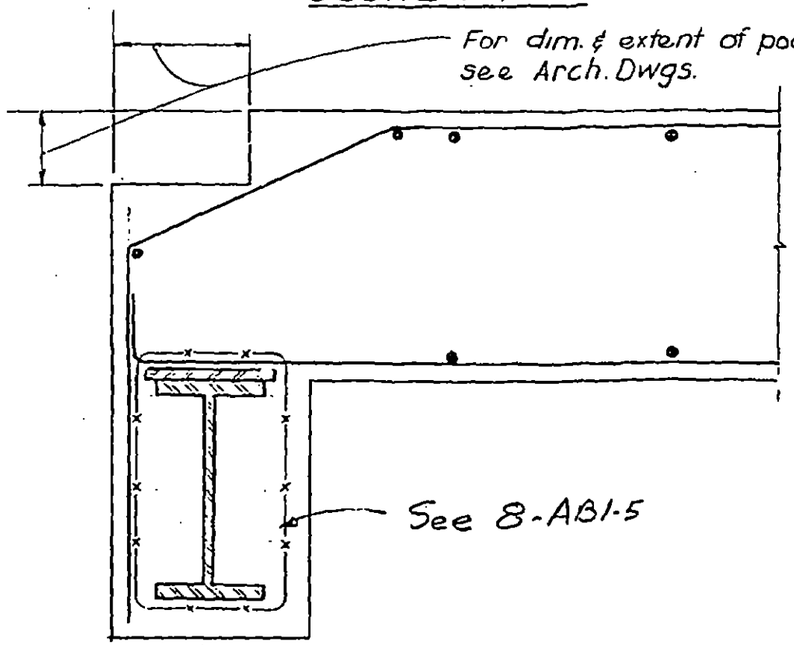
Section S-S



Section T-T



Section U-U



Section V-V

Section S-T-U-V similar to 8-AB4-9A except as shown

8-AB4-10.9

DESIGNED

DRAWN D.C.H.

SKILLING - HELLE - CHRISTIANSEN - ROBERTSON Structural & Civil Engineers

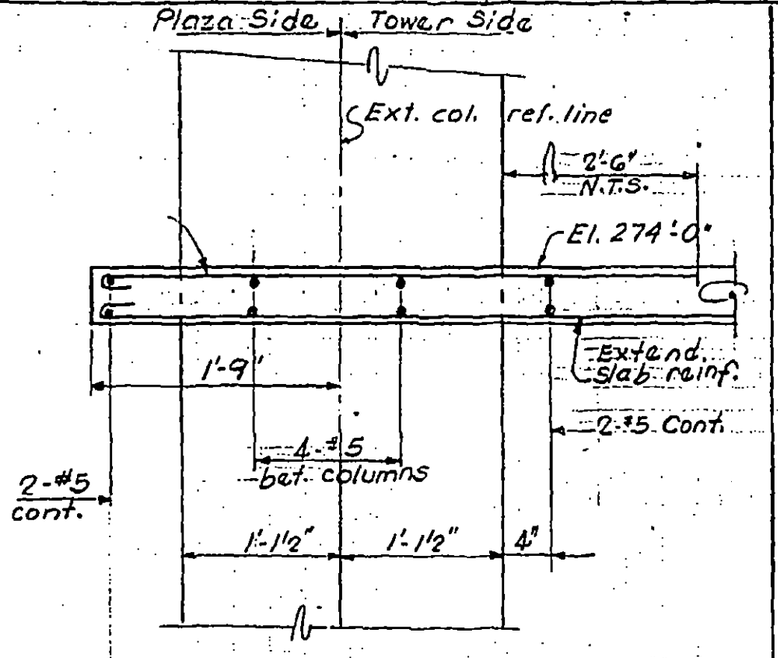
PROJECT THE WORLD TRADE CENTER | TITLE SECTIONS AT SUB-LEVEL #2, EL. 274'-0" | DATE 5-1-68

REVISIONS

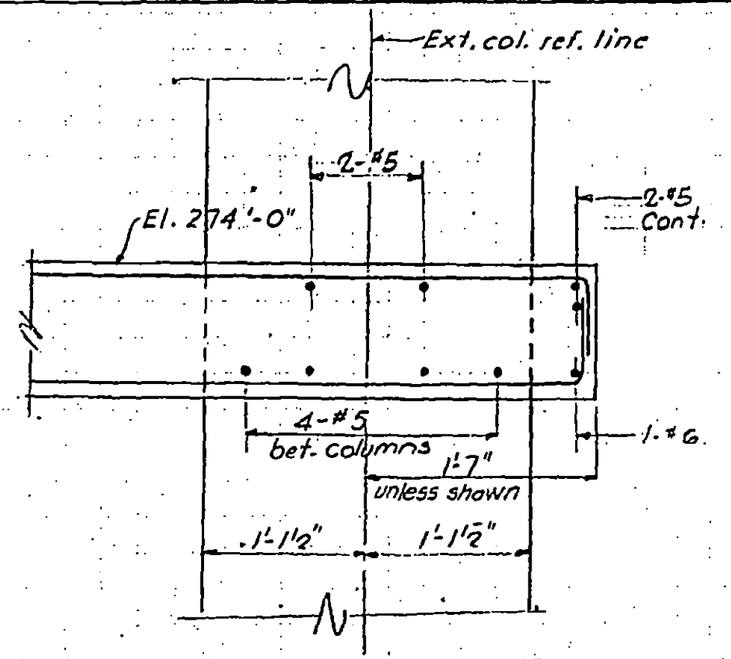
1-14-69

Gen. Revision 1-22-69

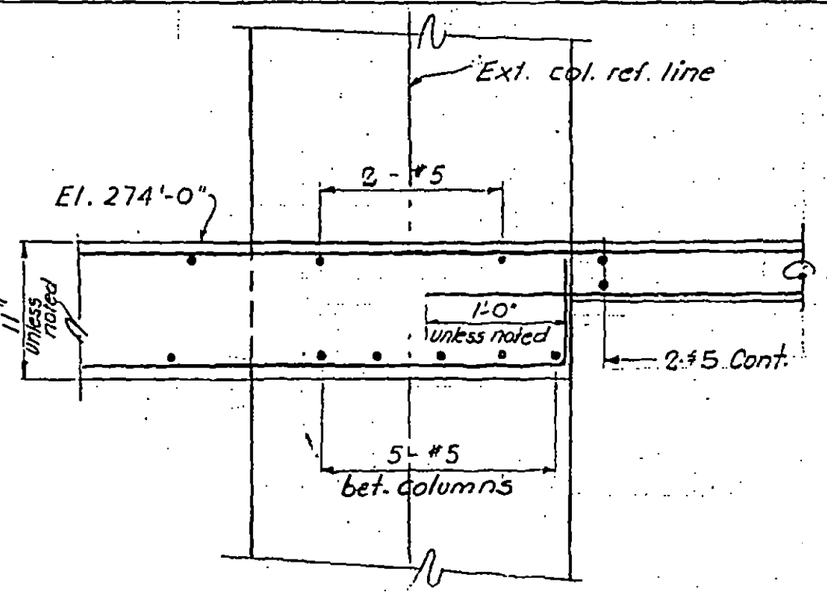
5-9-69



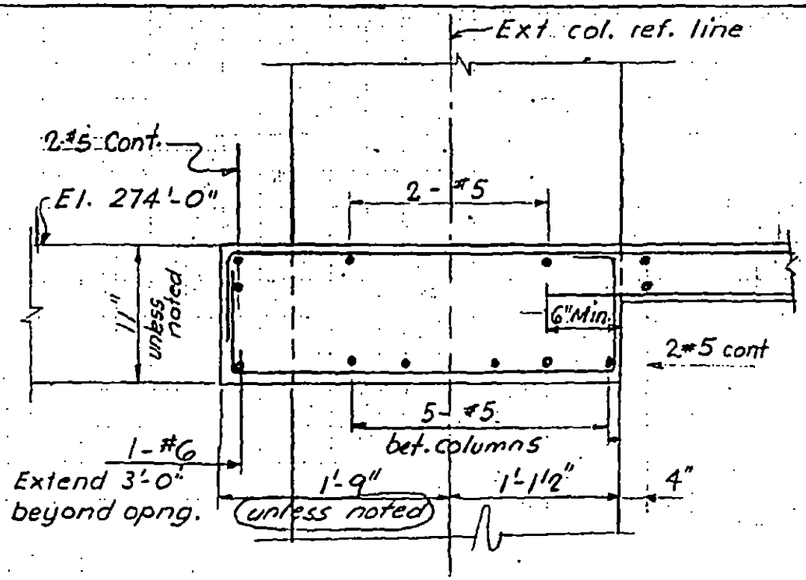
Section A-A



Section C-C



Section B-B



Section D-D

8-AB4-11.1

LICENSED PROFESSIONAL ENGINEER LESLIE E. ROBERTSON No. 34360 STATE OF NEW YORK

SKILLING - HELLE - CHRISTIANSEN - ROBERTSON Structural & Civil Engineers

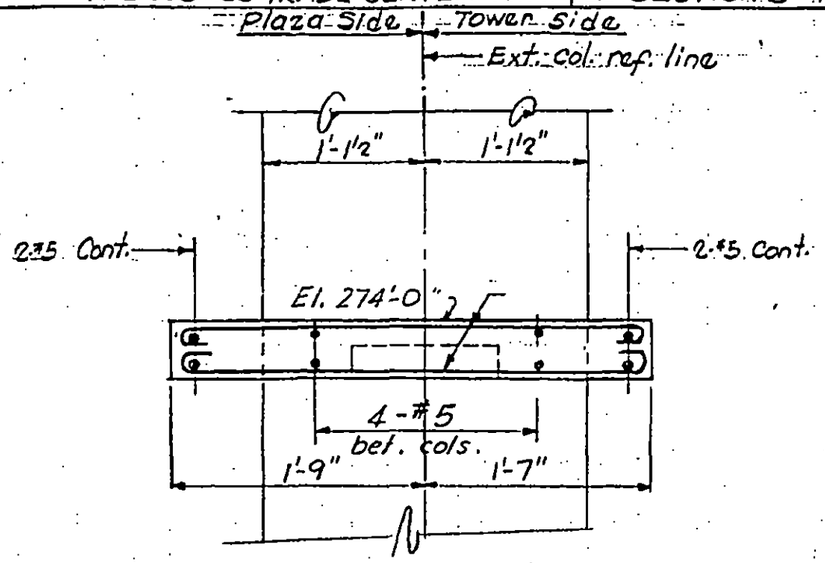
PROJECT THE WORLD TRADE CENTER | TITLE SECTIONS AT SUB-LEVEL #2, EL. 274'-0" | DATE 5-1-68

REVISIONS

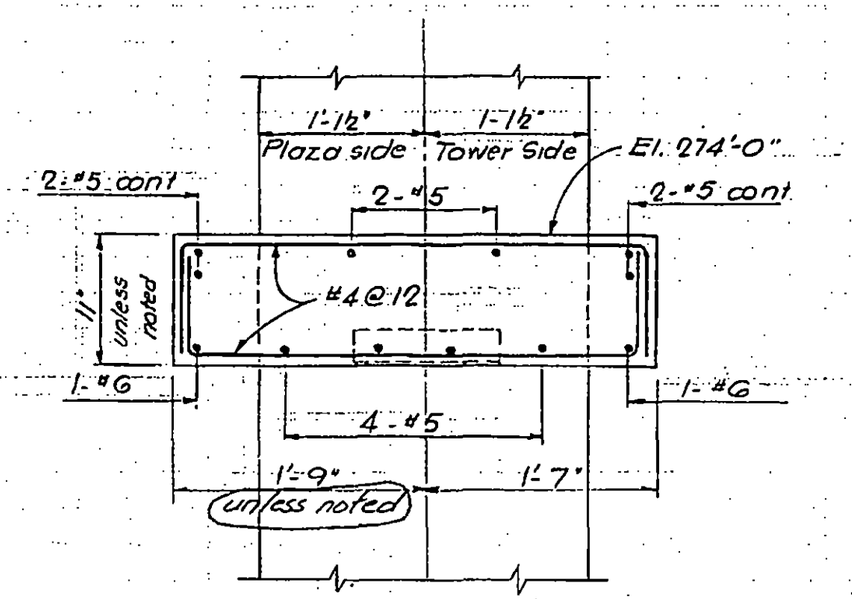
1-14-69

Gen. Revision 1-22-69

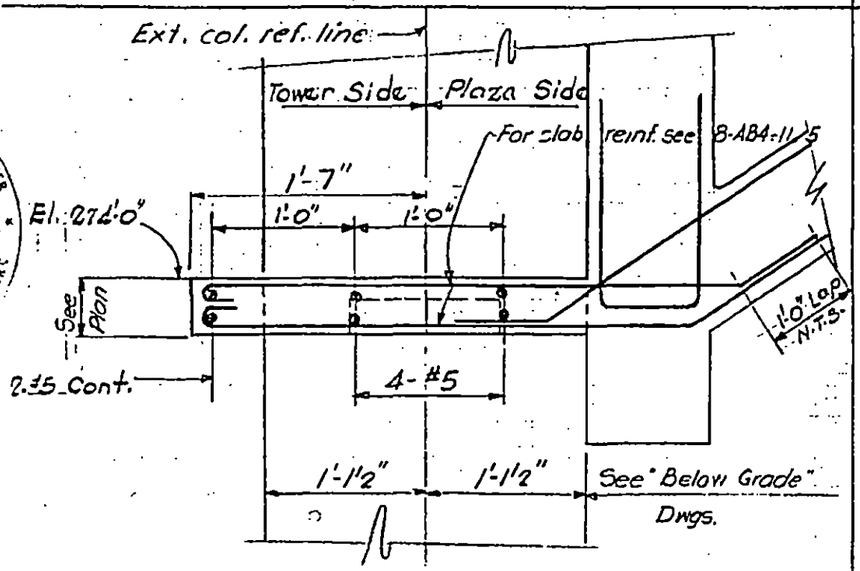
5-9-69



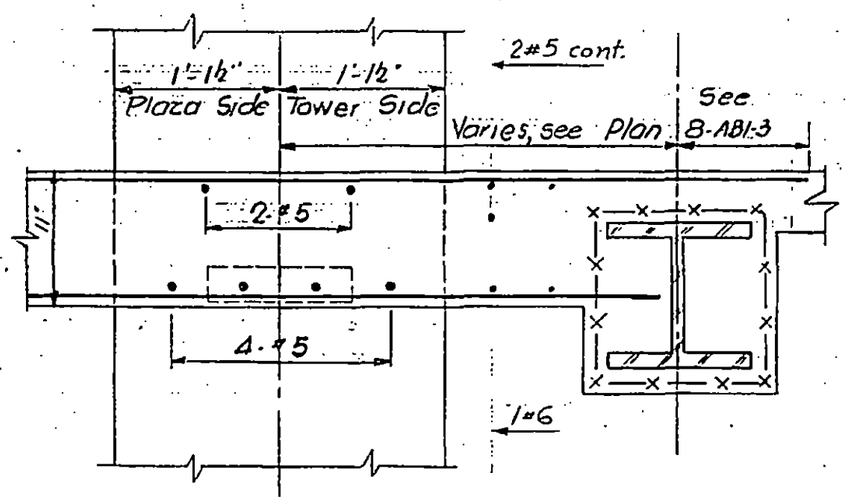
Section E-E



Section G-G



Section F-F



Section H-H

8-AB 4-11.2

LICENSED PROFESSIONAL ENGINEER
LESLIE E. ROBERTSON
No. 34360
UNIVERSITY OF THE STATE OF N.Y.

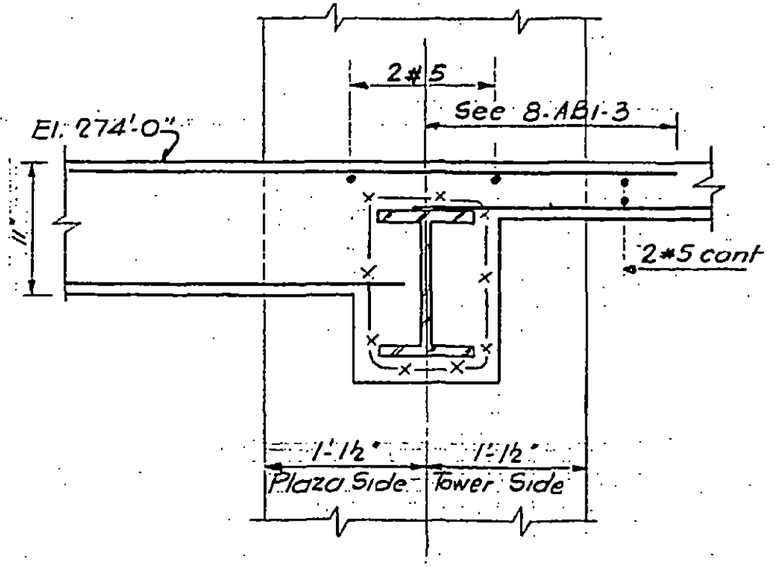
SKILLING - HELLE - CHRISTIANSEN - ROBERTSON Structural & Civil Engineers

PROJECT THE WORLD TRADE CENTER | TITLE SECTIONS AT SUB-LEVEL #2 - EL. 274'-0" | DATE 5-1-68

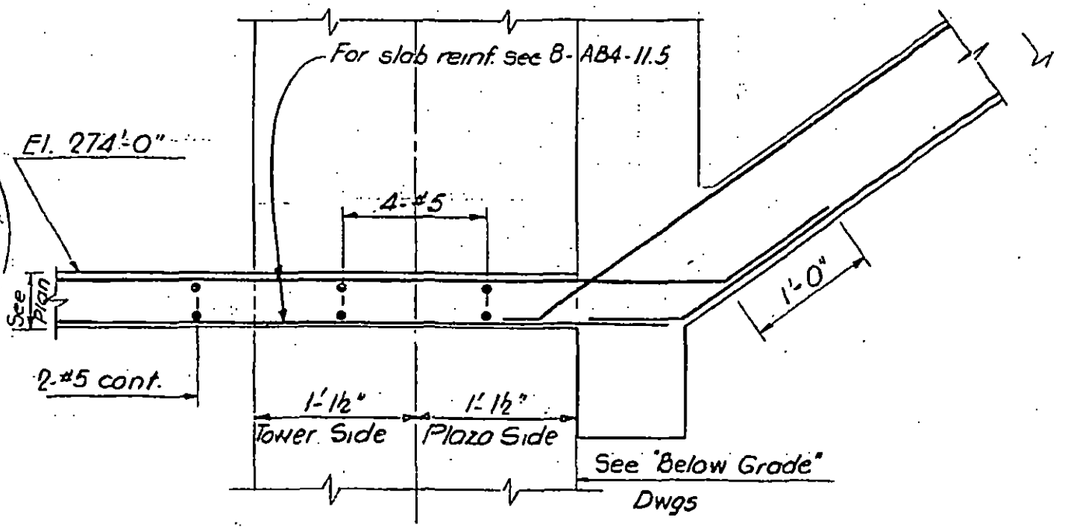
REVISIONS

1-14-69

Gen. Revision
1-22-69



Section M-M



Section K-K

LICENSED PROFESSIONAL ENGINEER
LESLIE E. ROBERTSON
No. 34360
UNIVERSITY OF THE STATE OF NEW YORK

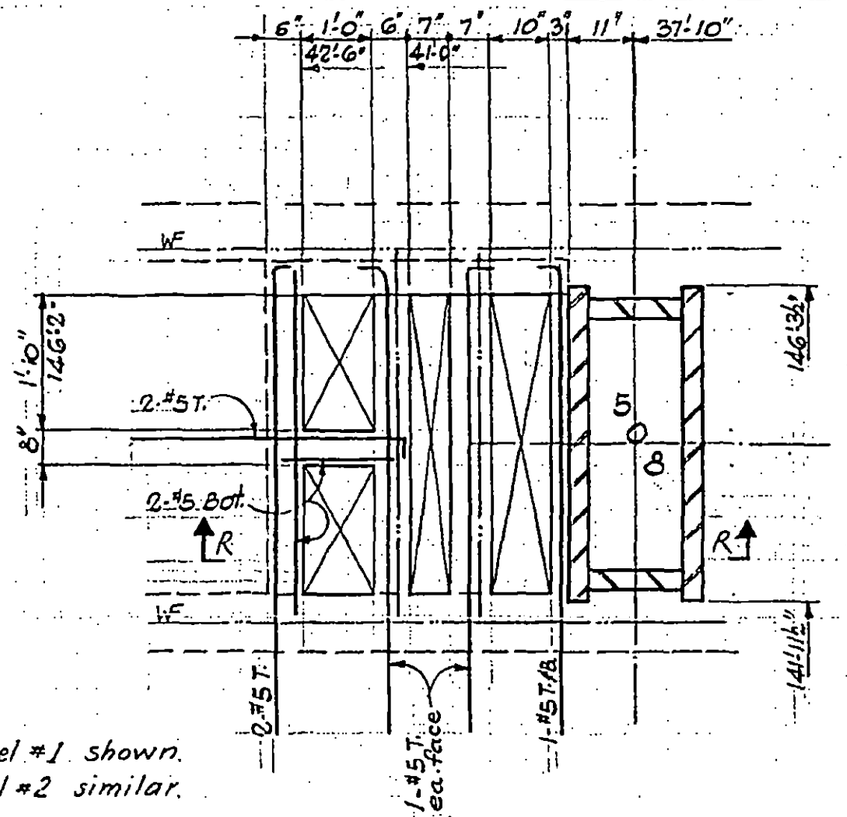
8-AB4-11.3

SKILLING - HELLE - CHRISTIANSEN - ROBERTSON Structural & Civil Engineers

PROJECT THE WORLD TRADE CENTER | TITLE DETAILS AT SUBLEVELS #1 & #2, EL. 274' & EL. 284' | DATE 5-1-68

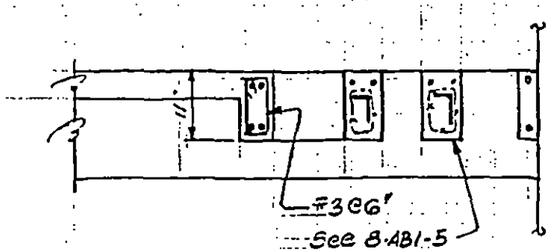
REVISIONS

8-20-68
1-14-69



Sublevel #1 shown.
Sublevel #2 similar.

Detail Plan S



Section R-R

8-AB4-11.4

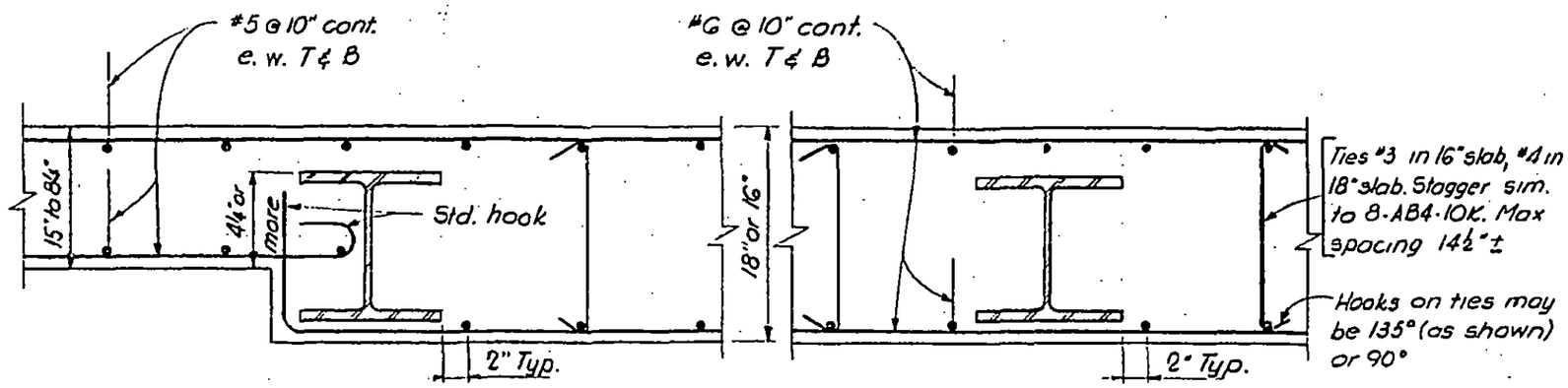
LICENSED PROFESSIONAL ENGINEER
LESLIE E. ROBERTSON
No. 34360
UNIVERSITY OF THE STATE OF NEW YORK

SKILLING, HELLE, CHRISTIANSEN, ROBERTSON — Structural & Civil Engineers

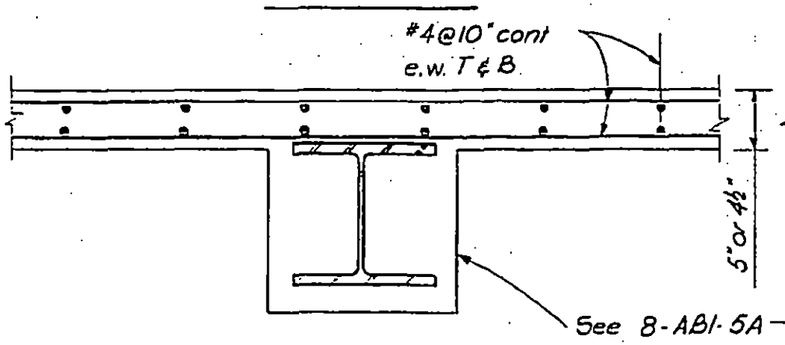
PROJECT THE WORLD TRADE CENTER | TITLE SECTIONS AT SUB-LEVEL #1 & #2, El. 274'-0" & 284'-0" | DATE 1-14-69

REVISIONS

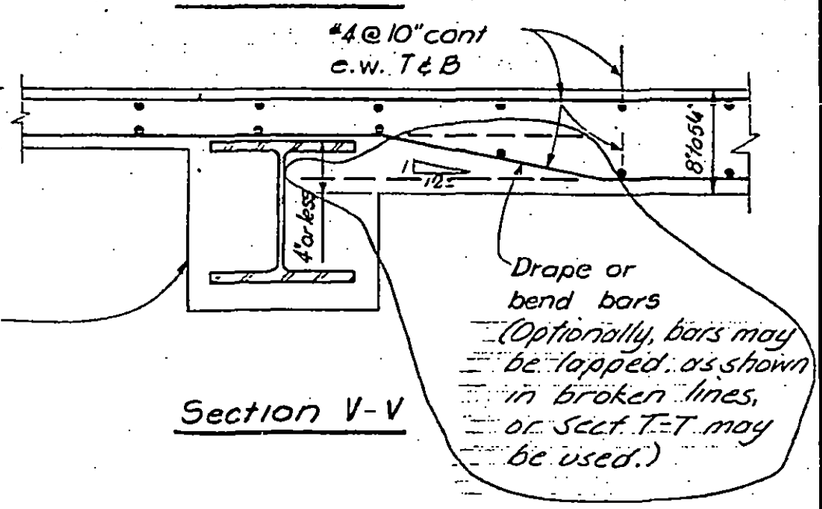
1-22-69
1-28-69
5-9-69
6-3-69



Section T-T



Section U-U



Section W-W

Section V-V

Notes:

1. Place bott. bars running in direction of span in the lowest layer, top bars in direction of span in the highest layer, except as shown in Tower Periphery Sections
2. Splice top bars by lapping at midspan, bott. bars over a support. For required length of lap see 8-AB1-3.2
3. Reinf. shown above is the minimum amount. Provide heavier reinf. where called for.
4. Provide ties (as shown in Sect. U-U) in all slabs where reinforcing heavier than typical is called for. Size of ties: #3 for 11'4"-15" slabs, #2 for 11" or thinner slabs
5. In slabs 12" or thicker, or where trim bars #6 or heavier are indicated, use Det. 8-AB4-9C for trim bars at opngs.

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DESIGNED

DRAWN G.T.H.

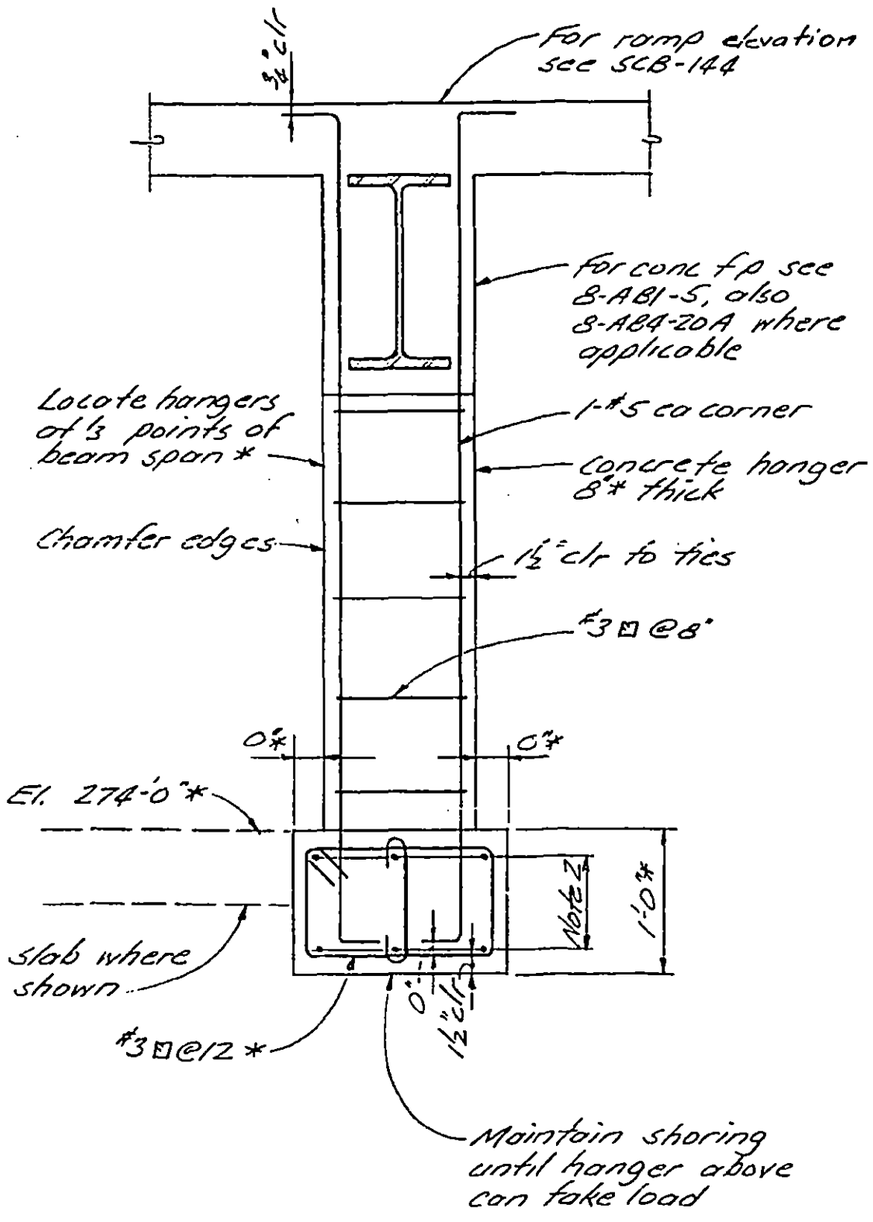
REVIEWED

8-AB4-11.5

SKILLING, HELLE, CHRISTIANSEN, ROBERTSON — Structural & Civil Engineers

PROJECT THE WORLD TRADE CENTER | TITLE SECTIONS AT SUBLEVELS #1 & #2, EL 274' & 284' | DATE 8-5-69

REVISIONS



SECTION Y-Y

Notes:
1. Asterisk (*) means "unless otherwise shown."
2. For reinforcing not shown see plans and Dwg SCB-144

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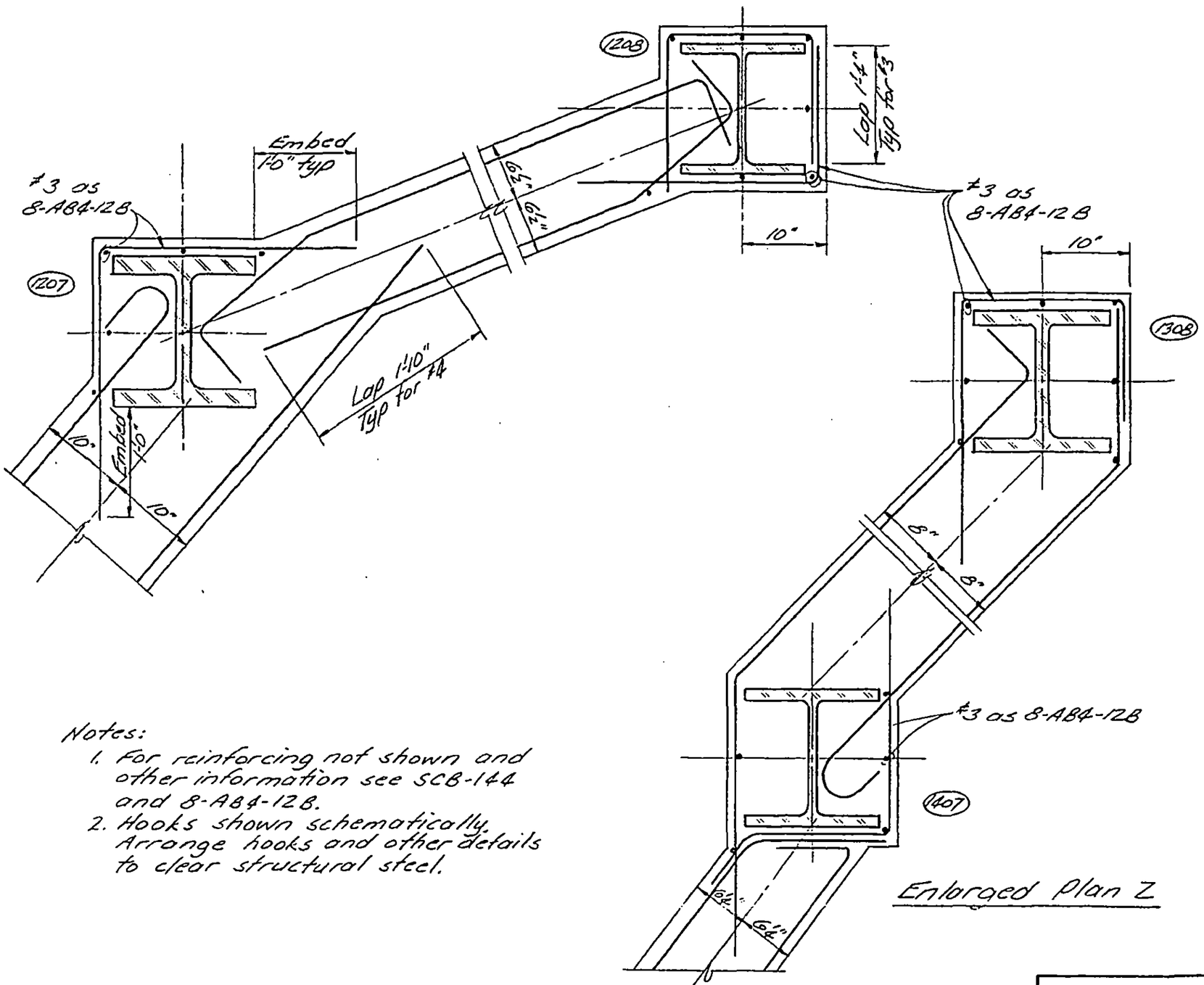
8-AB4-11.6

SKILLING, HELLE, CHRISTIANSEN, ROBERTSON — Structural & Civil Engineers

PROJECT: THE WORLD TRADE CENTER | TITLE: SECTIONS AT SUBLEVELS #1 & #2 EL 274' & 284' | DATE: 8-5-69

REVISIONS



Enlarged Plan Z

Notes:

1. For reinforcing not shown and other information see SCB-144 and 8-AB4-12B.
2. Hooks shown schematically. Arrange hooks and other details to clear structural steel.

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REVIEWED W.A. Brewer

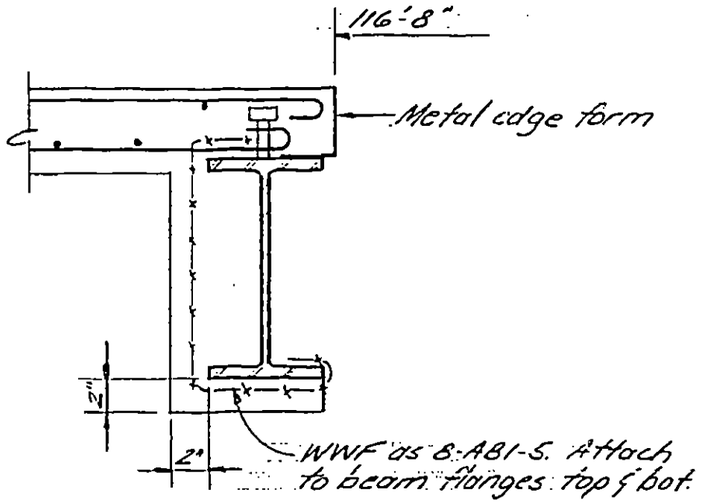
8-AB4-11.7

SKILLING, HELLE, CHRISTIANSEN, ROBERTSON — Structural & Civil Engineers

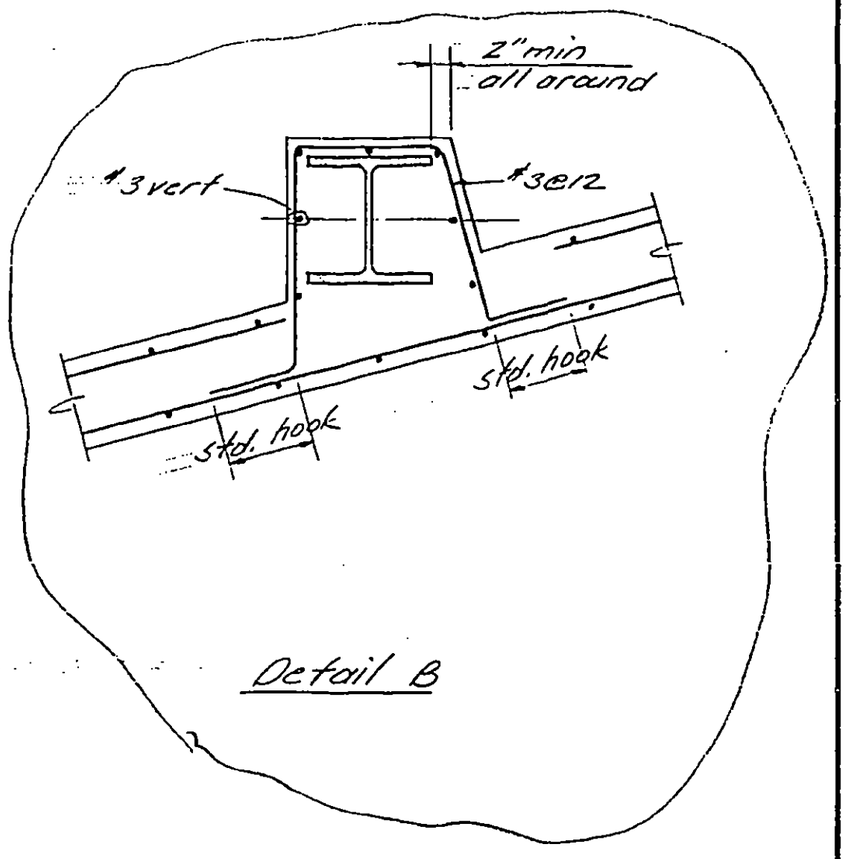
PROJECT: THE WORLD TRADE CENTER | TITLE: SECTIONS AT SUBLEVEL #1, EL 284 | DATE: 5-1-68

REVISIONS

8-5-68



Section A-A



Detail B

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UNIVERSITY OF THE STATE OF NEW YORK

DESIGNED

DRAWN

REVIEWED W. A. Brewer

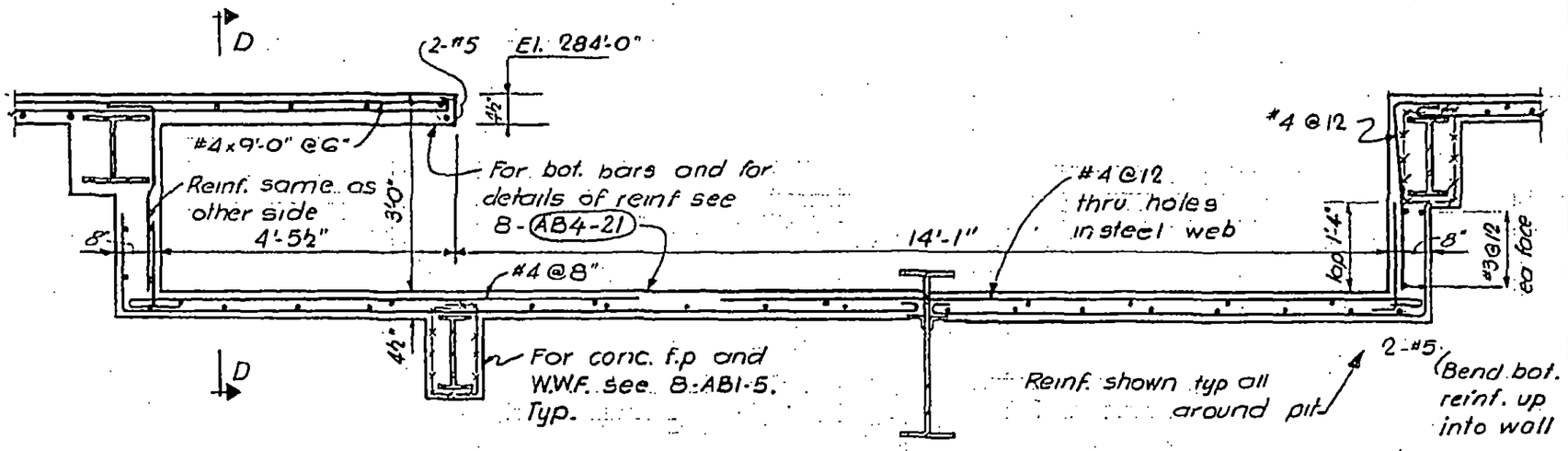
8-AB4-12.1

SKILLING - HELLE - CHRISTIANSEN - ROBERTSON Structural & Civil Engineers

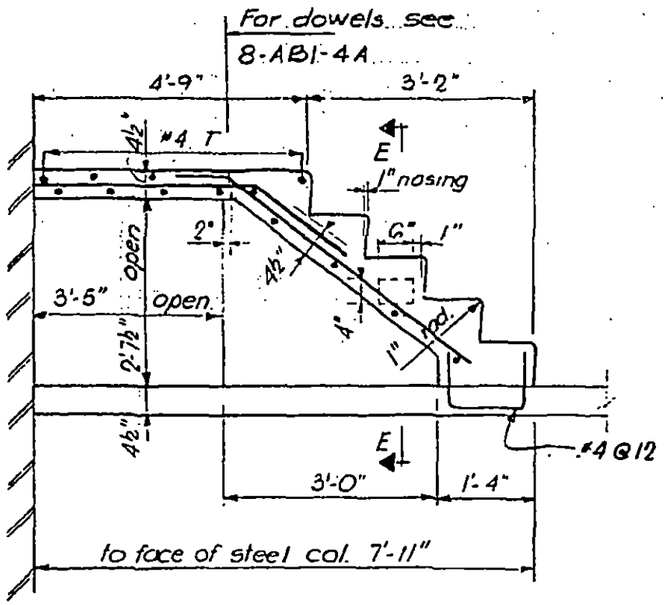
PROJECT THE WORLD TRADE CENTER | TITLE SECTIONS AT SUBLEVEL #1, El. 284'-0" | DATE 5-1-68

REVISIONS

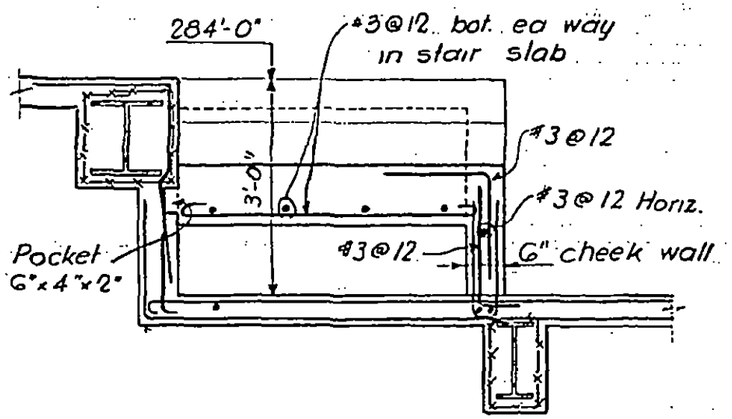
6-3-69



Section C-C



Section D-D



Section E-E

LICENSED PROFESSIONAL ENGINEER
LESLIE E. ROBERTSON
No. 84360
UNIVERSITY OF THE STATE OF NEW YORK

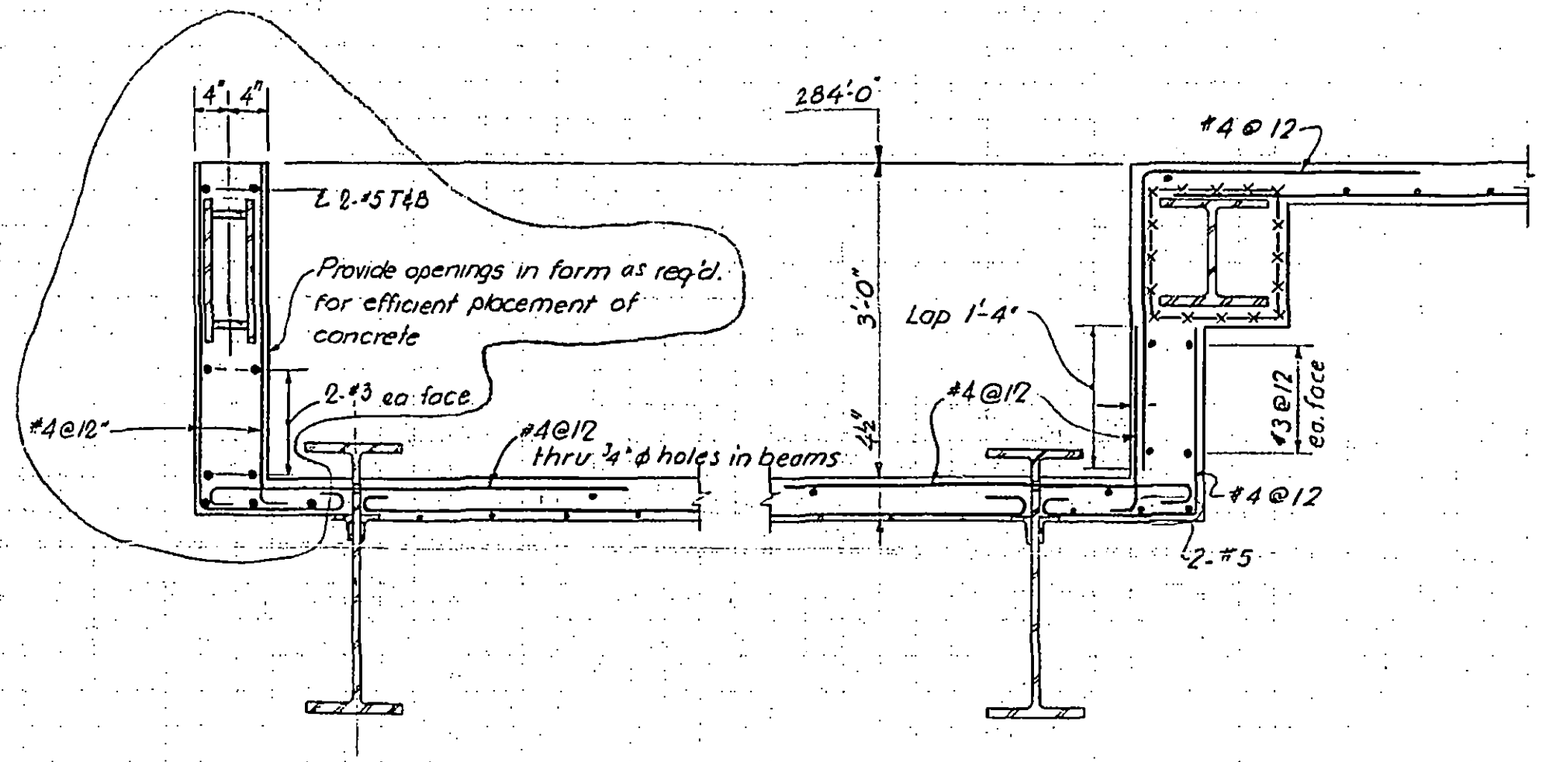
8-AB4-12.2

SKILLING - HELLE - CHRISTIANSEN - ROBERTSON Structural & Civil Enginoors

PROJECT THE WORLD TRADE CENTER | TITLE SECTIONS AT SUB-LEVEL #1, EL 284'-0" | DATE 5-1-68

REVISIONS

1-28-69



Section F-F

Section G-G

LICENSED PROFESSIONAL ENGINEER LESLIE E. ROBERTSON No. 84360 UNIVERSITY OF THE STATE OF NEW YORK

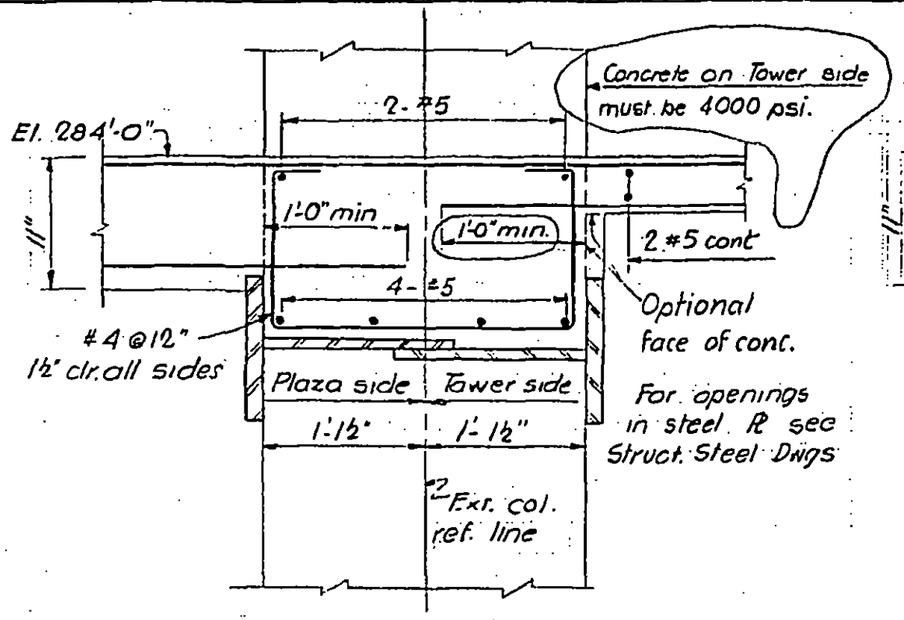
8.A84-12.3

SKILLING - HELLE - CHRISTIANSEN - ROBERTSON Structural & Civil Engineers

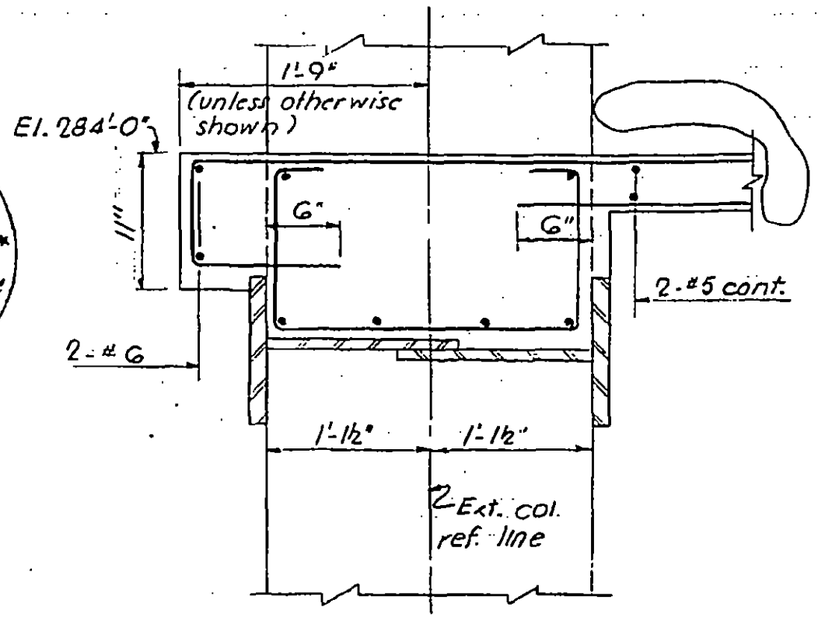
PROJECT THE WORLD TRADE CENTER | TITLE SECTIONS AT SUB LEVEL #1, El. 284'-0" | DATE 5-1-68

REVISIONS

1-28-69

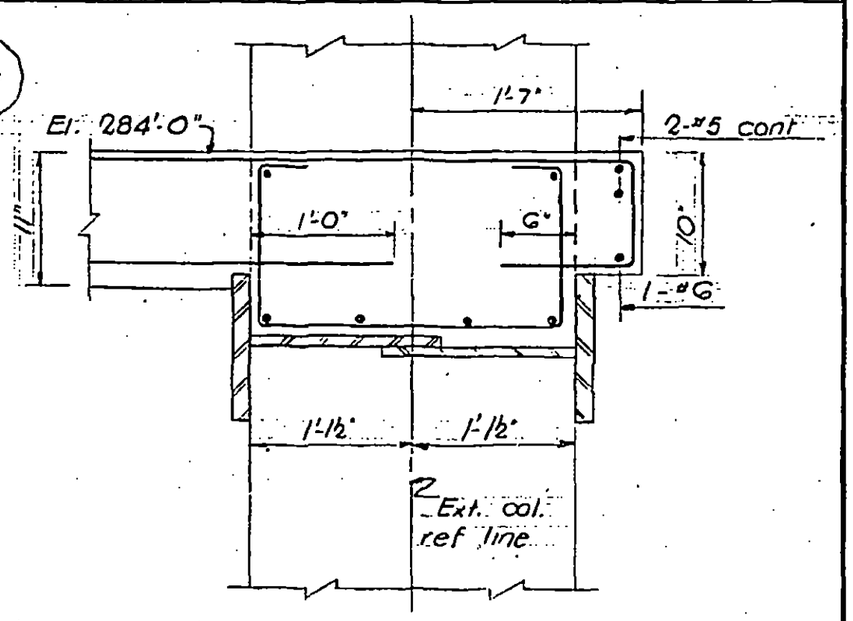


Section H-H



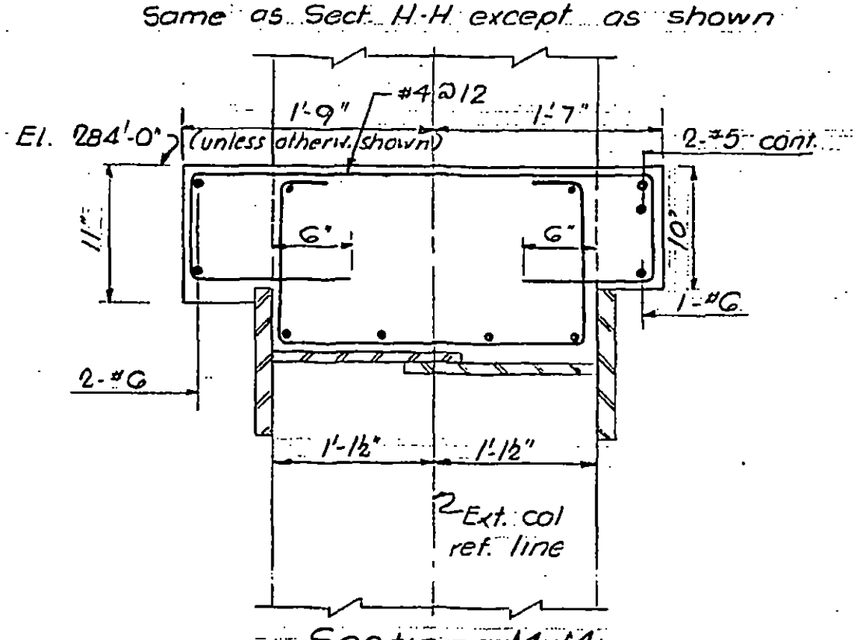
Section K-K

Same as Sect. H-H except as shown.



Section J-J

Same as Sect. H-H except as shown



Section M-M

Same as Sect. H-H except as shown

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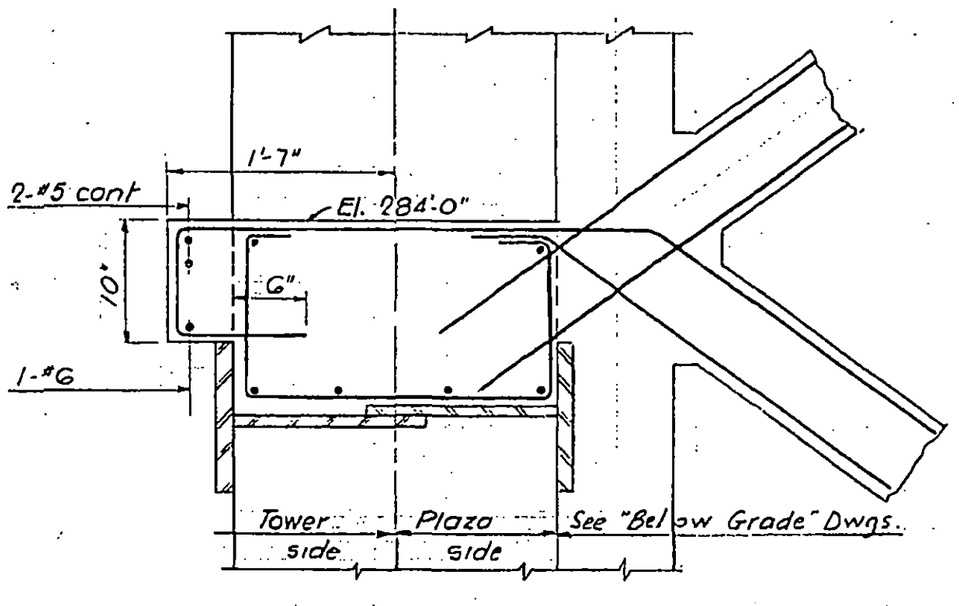
8-AB4-12.4

SKILLING - HELLE - CHRISTIANSEN - ROBERTSON Structural & Civil Engineers

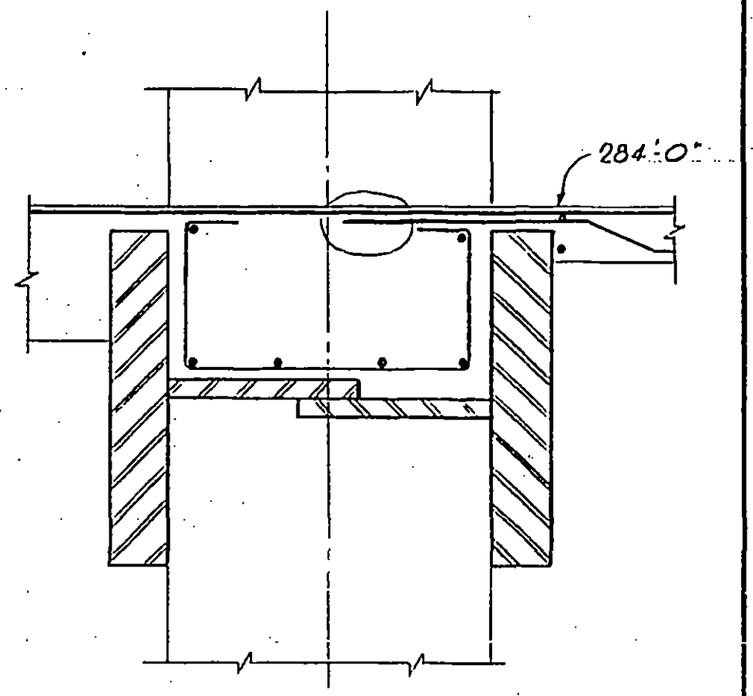
PROJECT THE WORLD TRADE CENTER | TITLE SECTIONS AT SUB-LEVEL #1, El. 284'-0" | DATE 5-1-68

REVISIONS

1-28-69

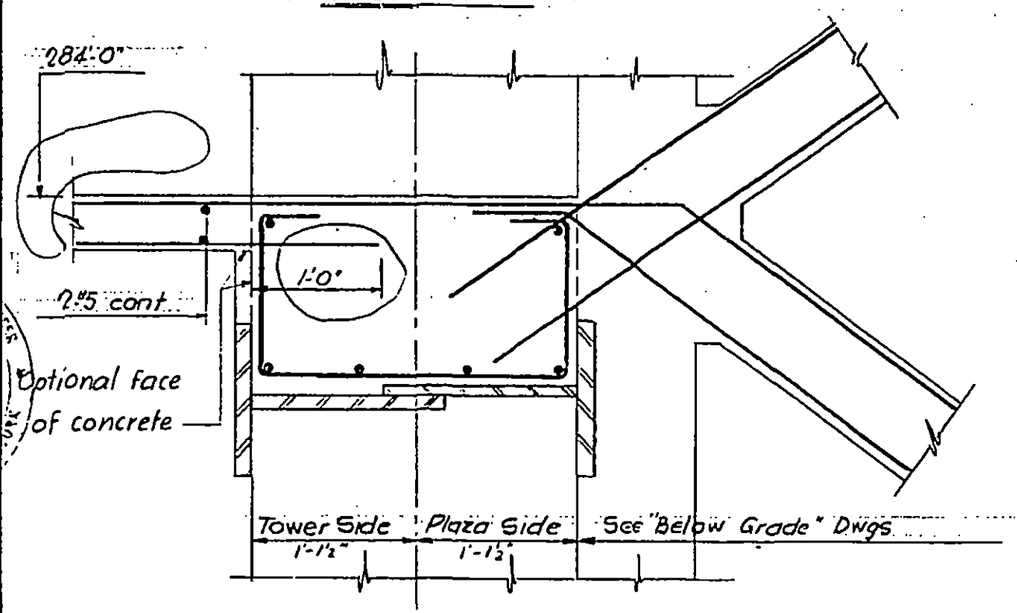


Section N-N



Section Q-Q

Similar to Sect. H-H on 8-AB4-12.4 except as shown



Section P-P

Sections N and P are similar to Sect. H-H on 8-AB4-12.4, except as shown.

LICENSED PROFESSIONAL ENGINEER
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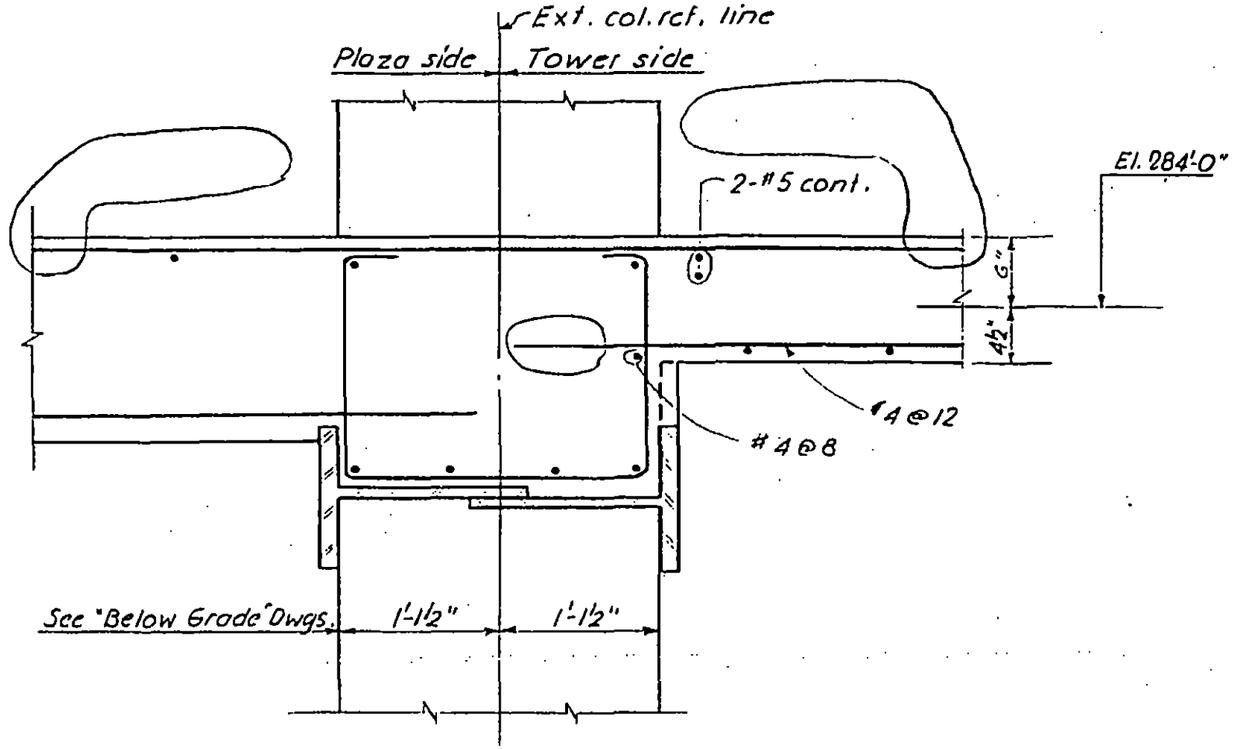
8-AB4-12.5

SKILLING - HELLE - CHRISTIANSEN - ROBERTSON Structural & Civil Engineers

PROJECT THE WORLD TRADE CENTER | TITLE SECTIONS AT SUB-LEVEL #1, EL-284'-0" | DATE 5-1-68

REVISIONS

1-28-69



Section R-R

Same as Section H-H on 8-AB4-12.4 except as otherwise shown.

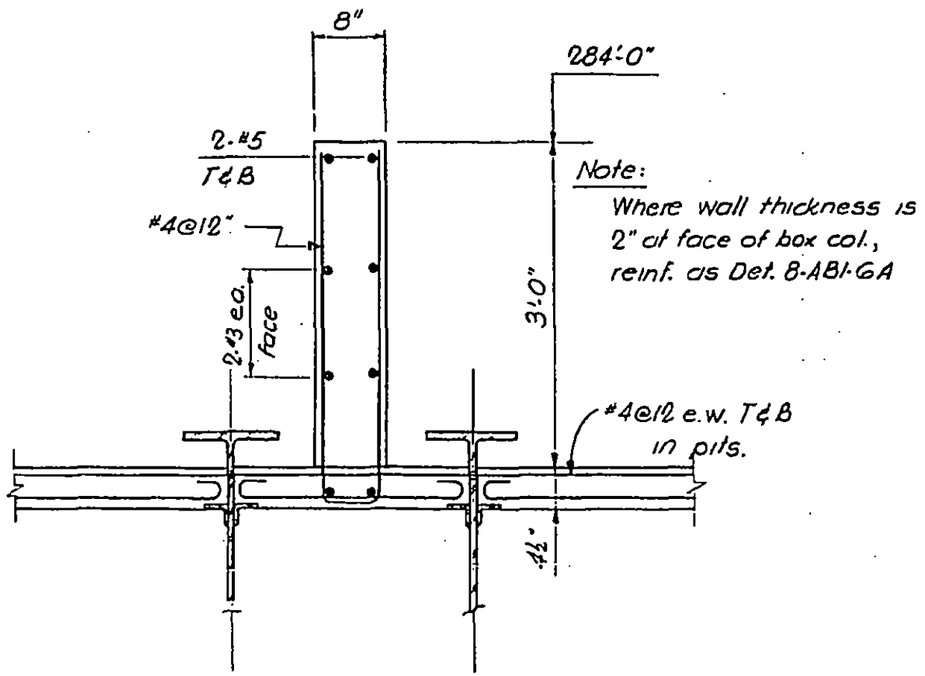
LICENSED PROFESSIONAL ENGINEER
LESLIE E. ROBERTSON
STATE OF NEW YORK

8-AB4-12.6

SKILLING, HELLE, CHRISTIANSEN, ROBERTSON — Structural & Civil Engineers

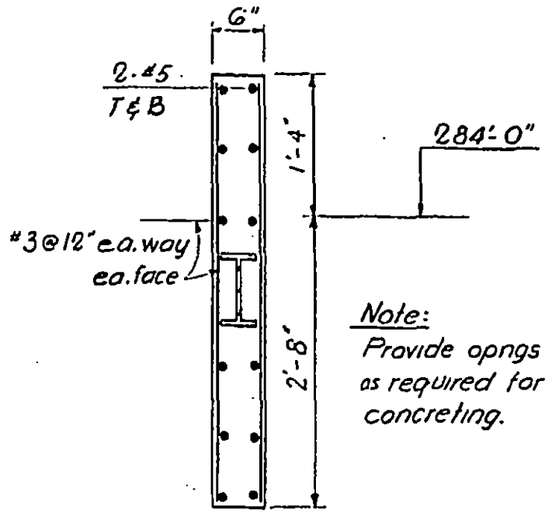
PROJECT: THE WORLD TRADE CENTER | TITLE: SECTIONS AT SUB-LEVEL #1, EL. 284'-0" | DATE: 1-28-69

REVISIONS



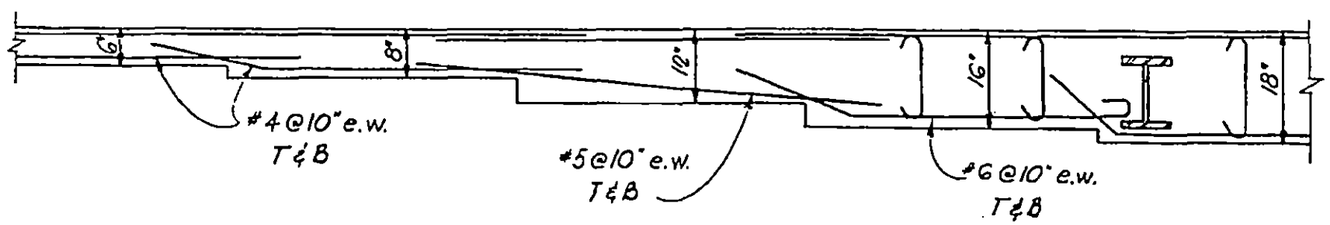
Note:
Where wall thickness is 2" at face of box col., reinf. as Det. 8-AB1-6A

Section S-S



Note:
Provide opngs in form as required for efficient concreting.

Section T-T



Section U-U

LICENSED PROFESSIONAL ENGINEER
LESLIE E. ROBERTSON
No. 34360
UNIVERSITY OF THE STATE OF NEW YORK

DESIGNED

DRAWN
G.T.H.

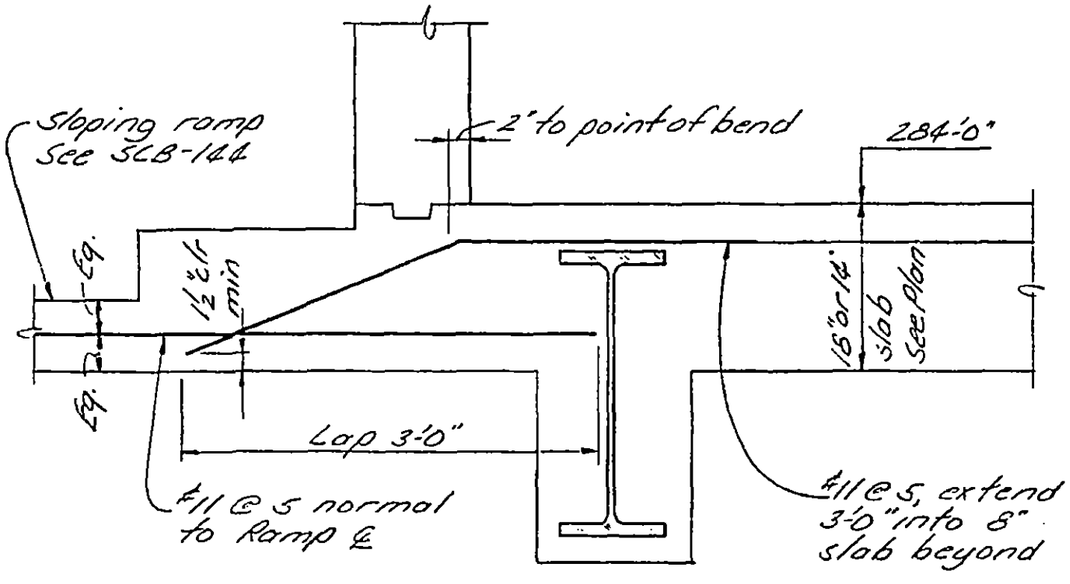
REVIEWED

8-AB4-12.7

SKILLING, HELLE, CHRISTIANSEN, ROBERTSON — Structural & Civil Engineers

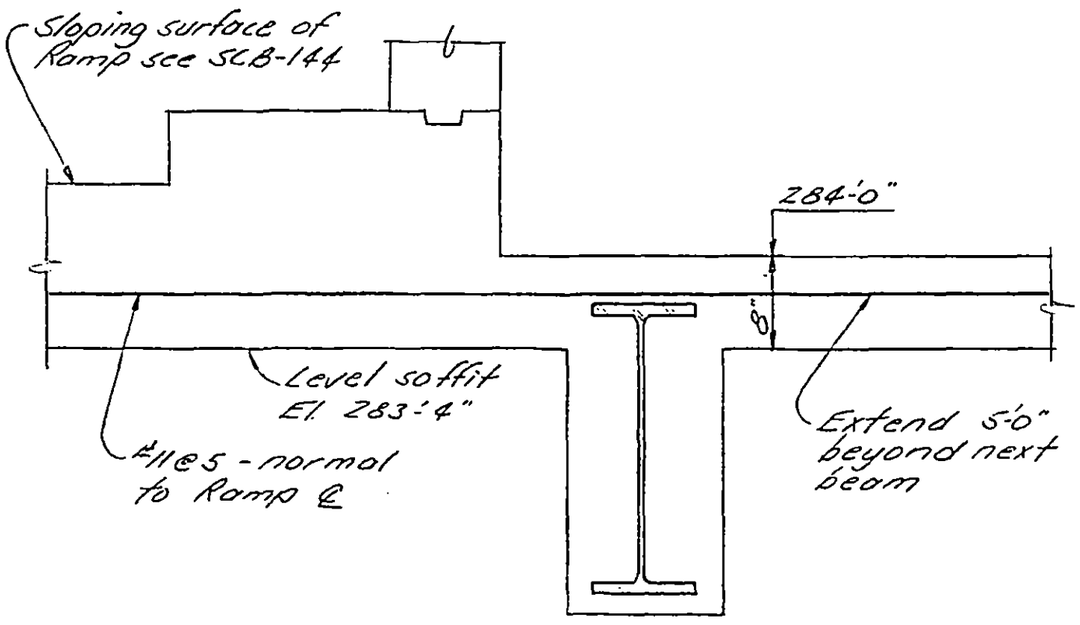
PROJECT: THE WORLD TRADE CENTER | TITLE: SECTIONS AT SUBLEVEL #1, EL 284'-0" | DATE: 8-5-69

REVISIONS



Section V-V

Note to sect V℄W #11 bars are additional to reinf shown in plans and details



Section W-W

LICENSED PROFESSIONAL ENGINEER — LESLIE E. ROBERTSON — No. 34360 — UNIVERSITY OF THE STATE OF NEW YORK

DESIGNED

DRAWN

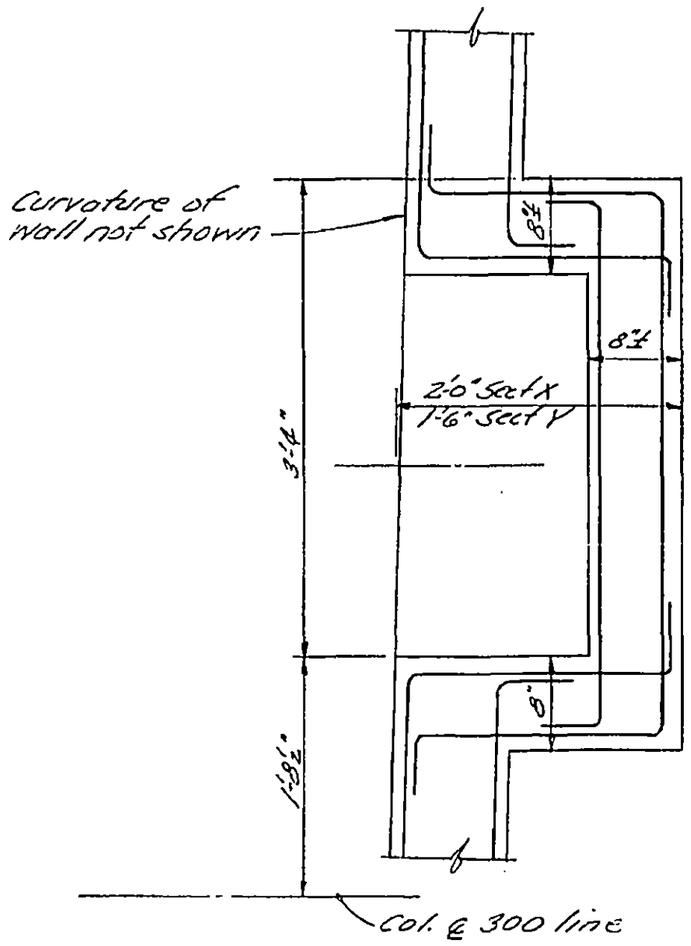
REVIEWED W. A. Brewer

8-A84-12.8

SKILLING, HELLE, CHRISTIANSEN, ROBERTSON — Structural & Civil Engineers

PROJECT THE WORLD TRADE CENTER | TITLE SECTION AT SUBLEVEL #1, EL 284'-0" | DATE 8-5-69

REVISIONS



Sectional Plan X-X as shown

Sectional Plan Y-Y opp hand ℄as noted

Notes:

1. Horizontal and vertical reinforcing similar to Section O-O on SCB-144
2. Provide chases, pockets and other features as shown on Architectural Design Dwgs and Approved shop Dwgs.

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DESIGNED

DRAWN

REVIEWED W.d. Brewer

8-AB4-12.9

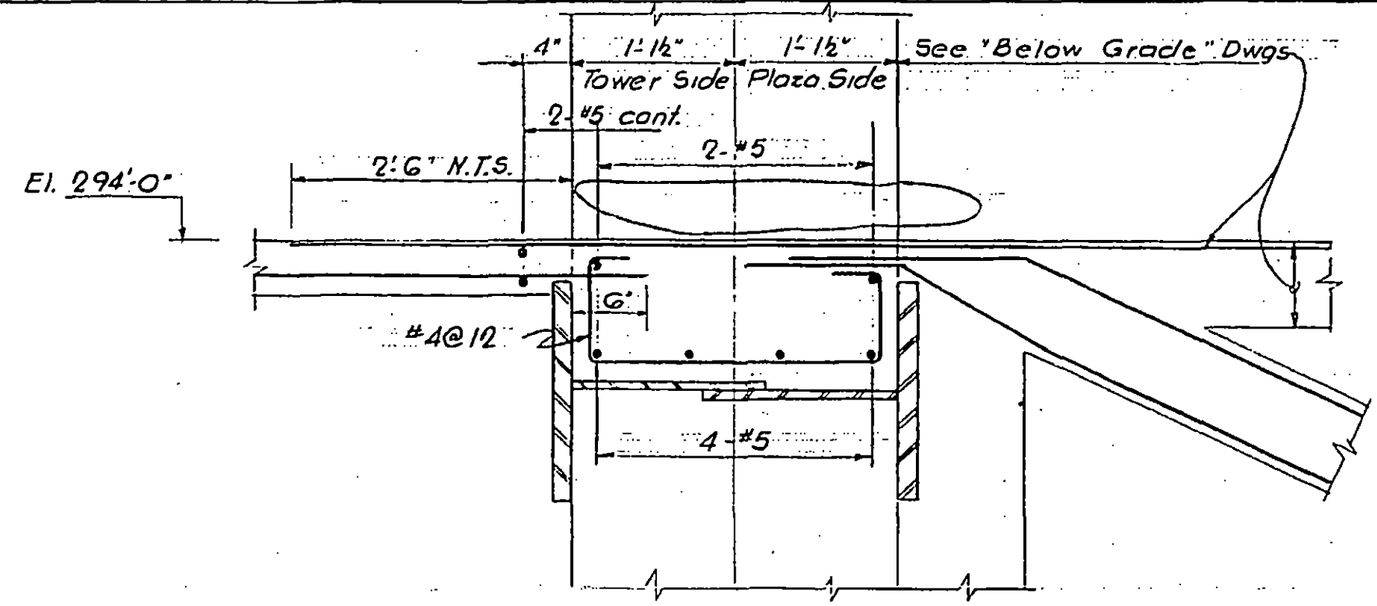
SKILLING - HELLE - CHRISTIANSEN - ROBERTSON Structural & Civil Engineers

PROJECT THE WORLD TRADE CENTER | TITLE SECTIONS AT SERVICE LEVEL, EL. 294'-0" | DATE 5-1-68

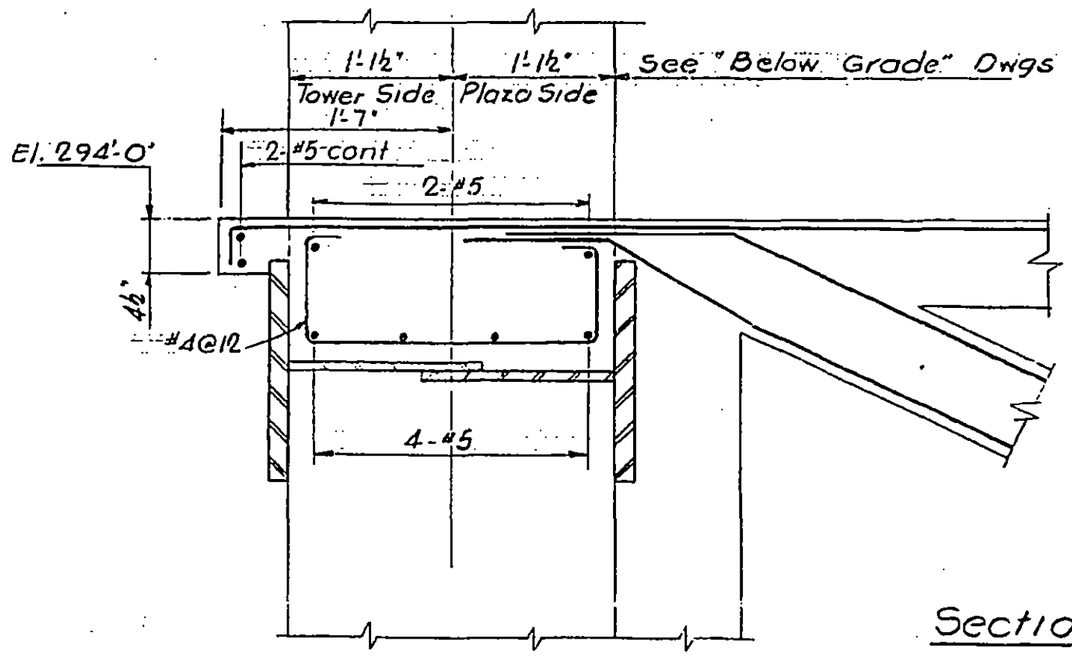
REVISIONS

6-3-69

7-11-69



No Slab Opening



Section A-A

At Opening on Tower Side

8-AB4-13.1

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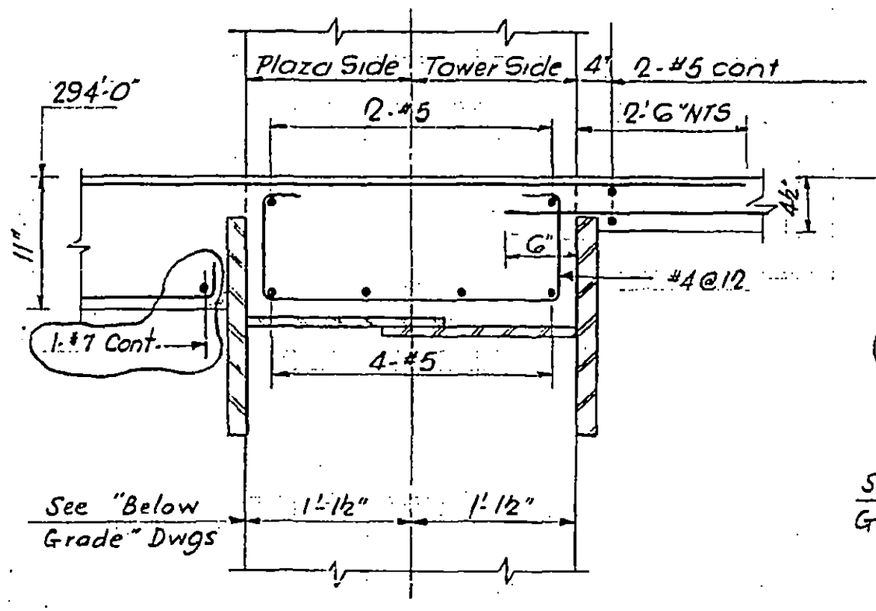
No. 34360
UNIVERSITY OF THE STATE OF NEW YORK

SKILLING - HELLE - CHRISTIANSEN - ROBERTSON Structural & Civil Engineers

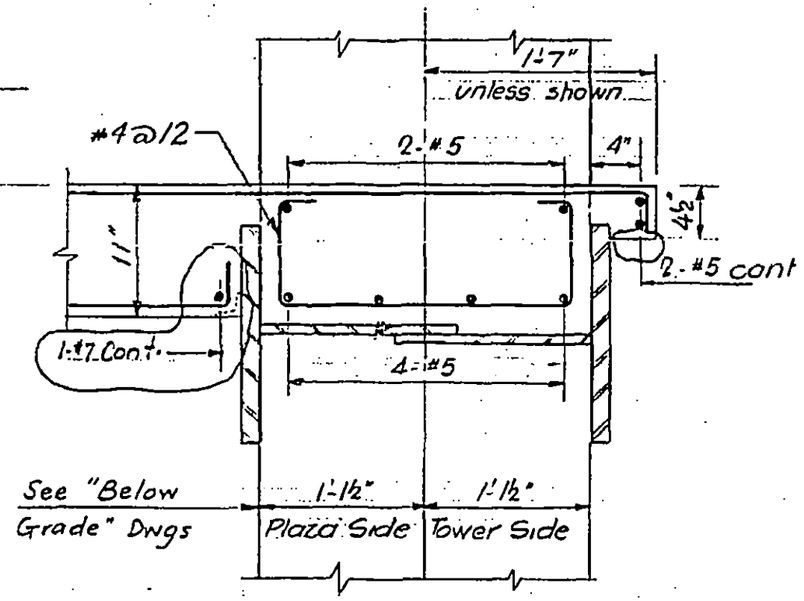
PROJECT THE WORLD TRADE CENTER | TITLE SECTIONS AT SERVICE LEVEL, EL. 294'-0" | DATE 5-1-68

REVISIONS

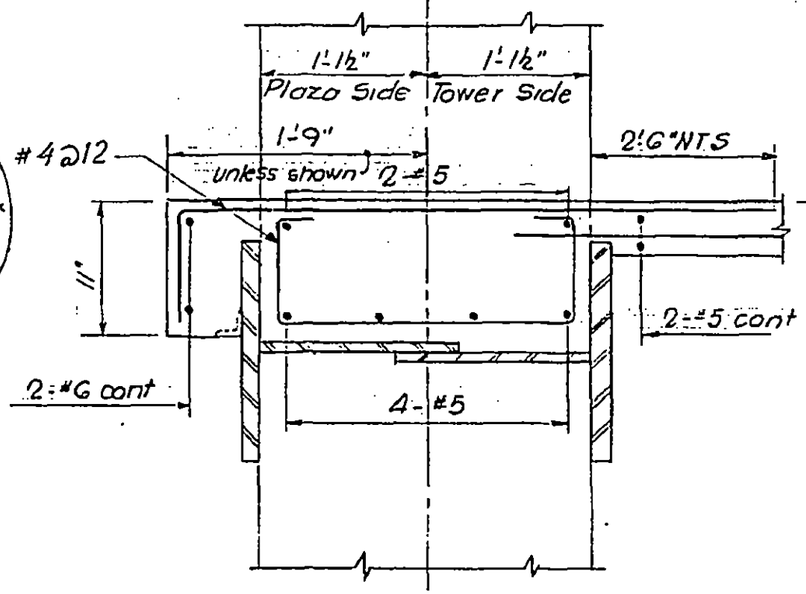
12-9-68



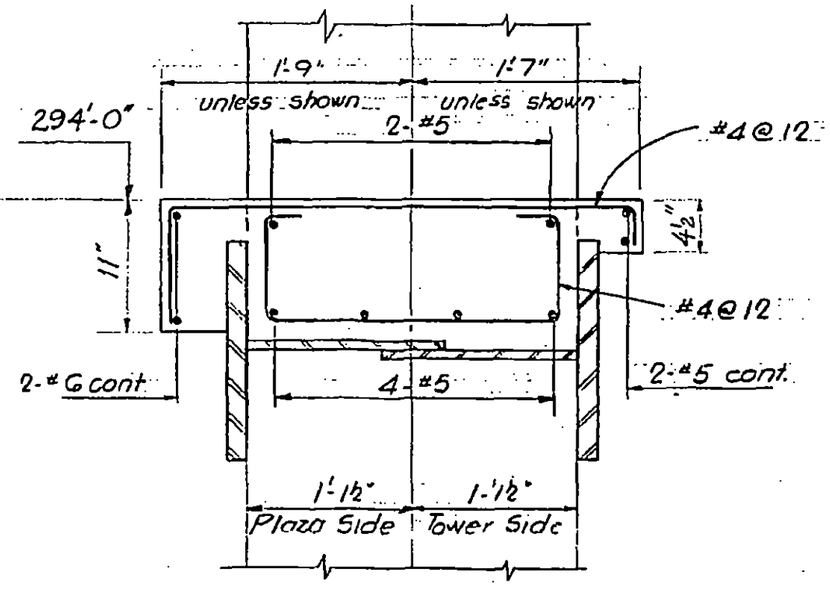
Section B-B



Section C-C



Section D-D



Section E-E

8-AB4-13.2

LICENSED PROFESSIONAL ENGINEER
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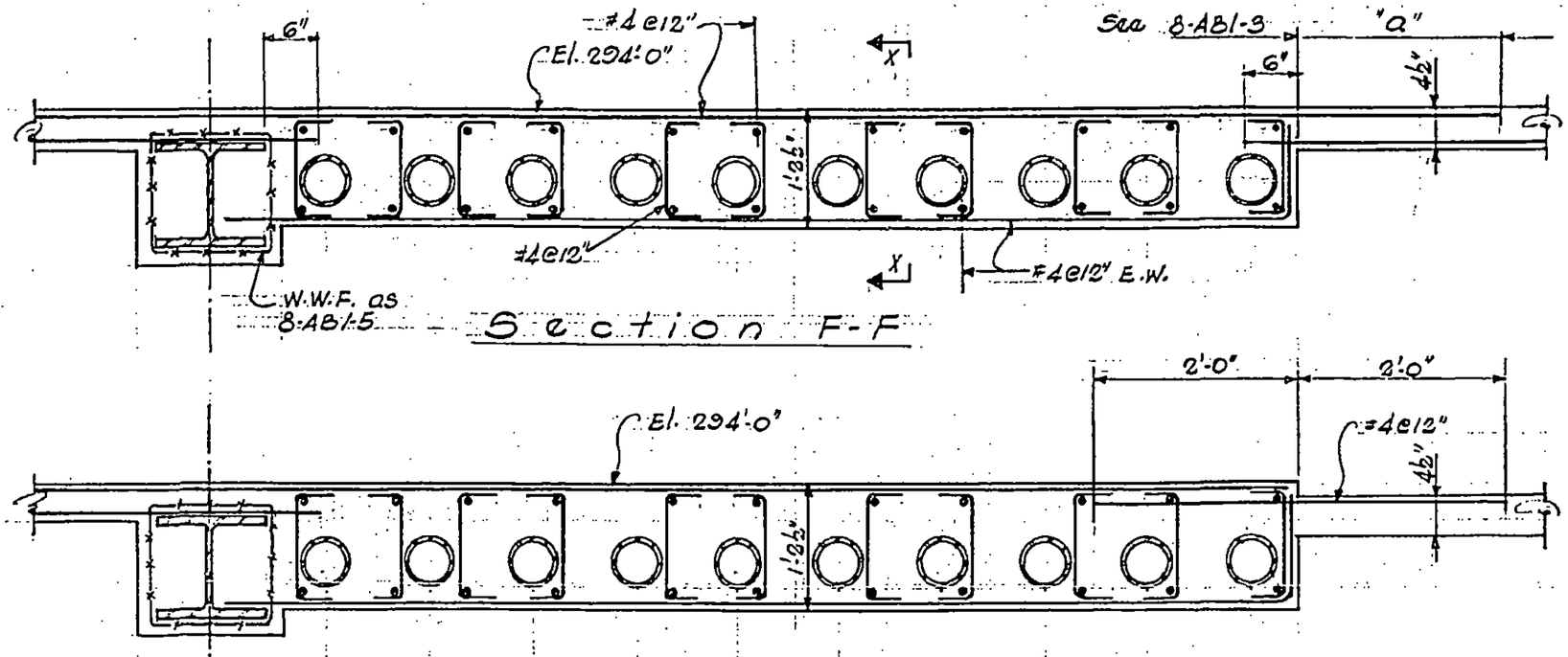
No. 34360
UNIVERSITY OF THE STATE OF NEW YORK

SKILLING - HELLE - CHRISTIANSEN - ROBERTSON Structural & Civil Engineers

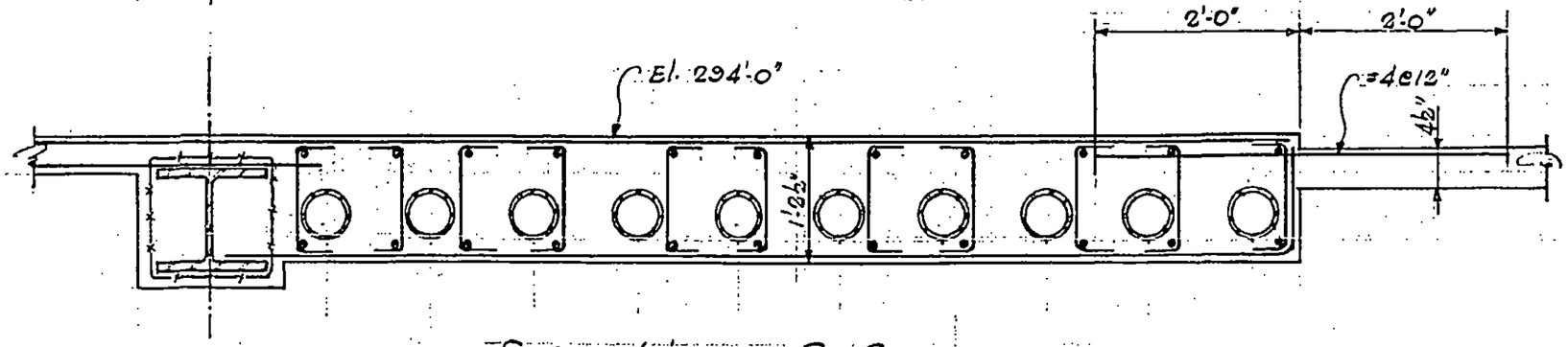
PROJECT THE WORLD TRADE CENTER | TITLE SECTIONS AT SERVICE LELEL, EL. 294' | DATE 5-1-68

REVISIONS

8-20-68

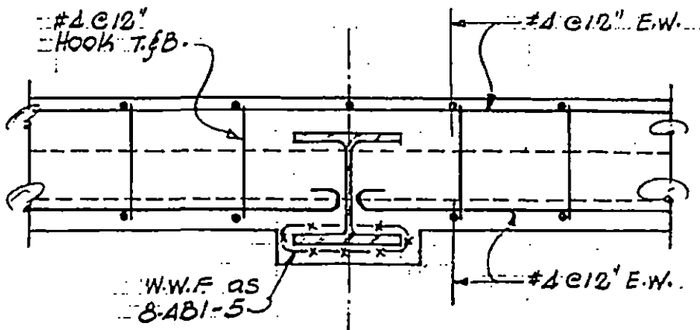


Section F-F



Section G-G

Balace of section as per section F-F



Section X-X

LICENSED PROFESSIONAL ENGINEER
LESLIE E. ROBERTSON
No. 34960
UNIVERSITY OF THE STATE OF NEW YORK

Notes:

1. Electrical conduits are shown schematically. For actual data see approved Electrical Shop Dwgs.
2. Vertical bars shown hooked may be combined into stirrups, subject to Engineer's approval.
3. Bar spacings shown are the greatest allowed. Closer spacing may be needed to conform with layout of conduits.

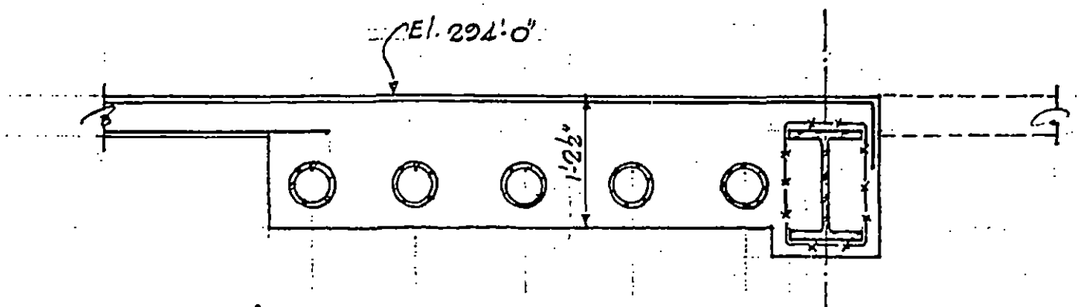
8-AB4-13.3

SKILLING - HELLE - CHRISTIANSEN - ROBERTSON Structural & Civil Engineers

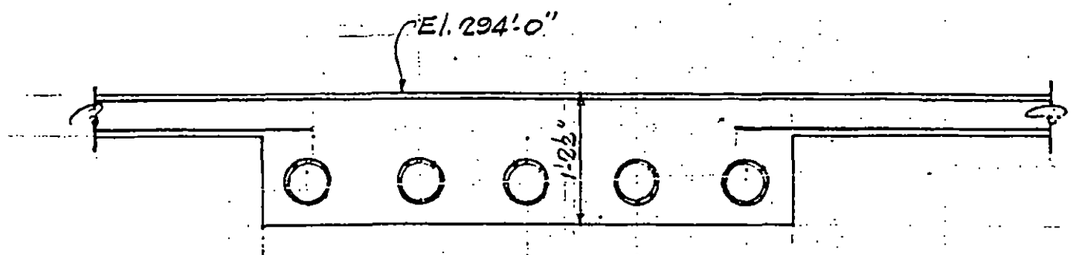
PROJECT THE WORLD TRADE CENTER | TITLE SECTIONS AT SERVICE LEVEL, EL. 294' | DATE 5-1-68

REVISIONS

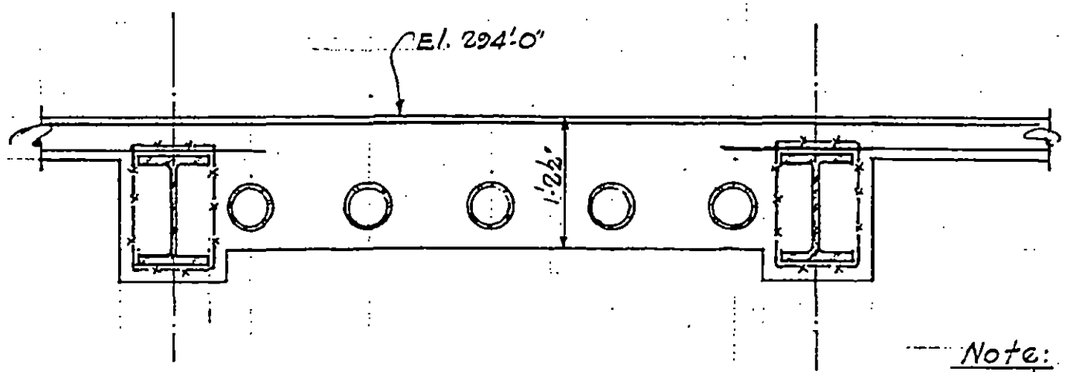
8-20-68



Section H-H



Section J-J



Section K-K

Note:
Sections H, J & K are similar to Section F-F on S-AB4-13.3, except as noted.

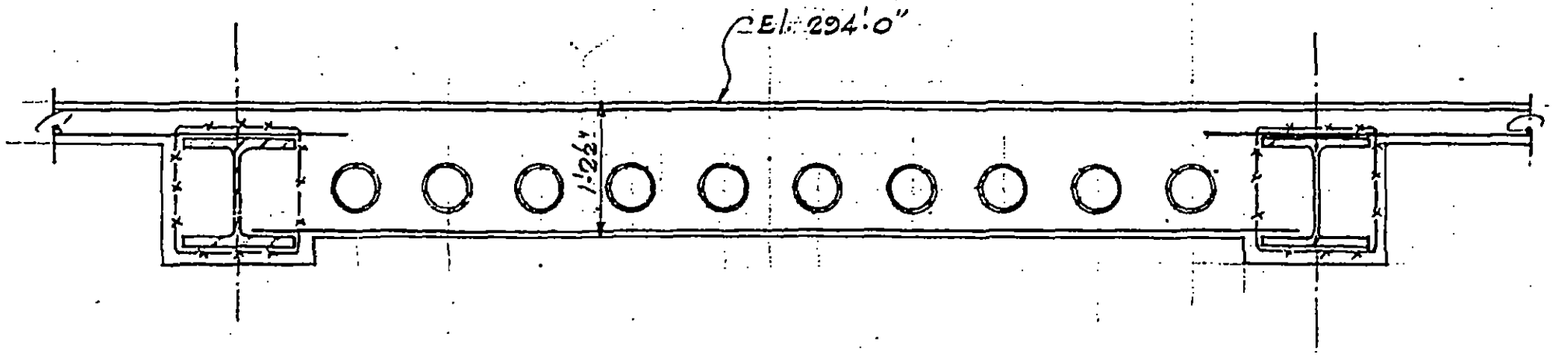
LICENSED PROFESSIONAL ENGINEER
LESLIE E. ROBERTSON
No. 34360
UNIVERSITY OF THE STATE OF NEW YORK

S-AB4-13.4

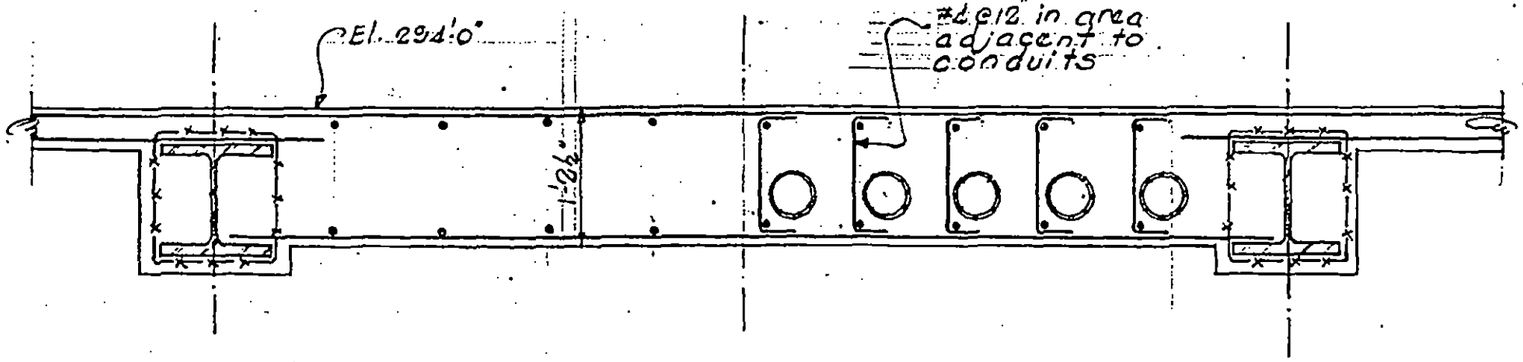
SKILLING - HELLE - CHRISTIANSEN - ROBERTSON Structural & Civil Engineers

PROJECT THE WORLD TRADE CENTER | TITLE SECTIONS AT SERVICE LEVEL, EL. 294' | DATE 5-1-68

REVISIONS



Section L-L



Section M-M

Note:
Sections L & M are similar to Section F-F on 8-AB4-13.3, except as shown.

LICENSED PROFESSIONAL ENGINEER
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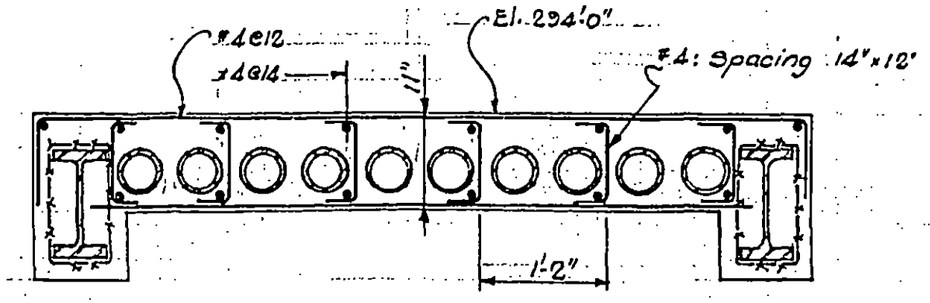
No. 34360
UNIVERSITY OF THE STATE OF NEW YORK

8-AB4-13.5

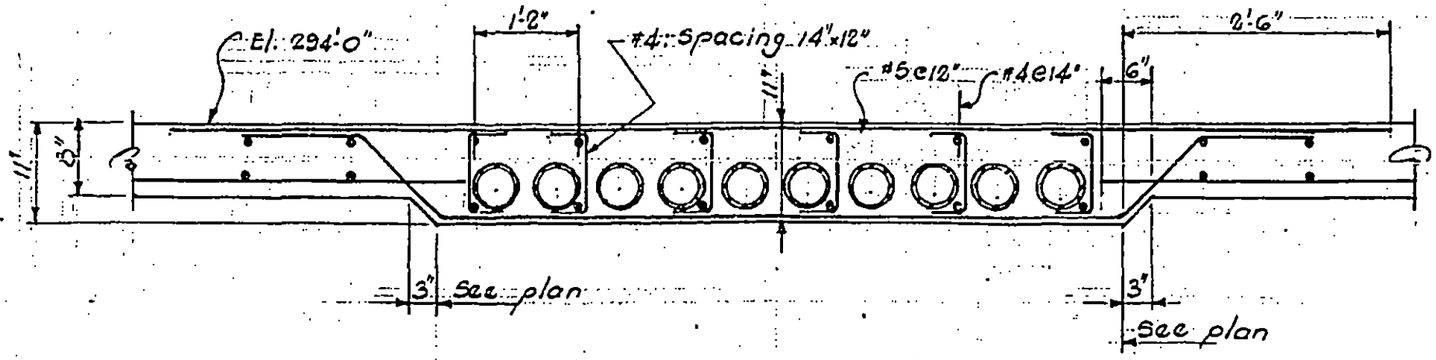
SKILLING - HELLE - CHRISTIANSEN - ROBERTSON Structural & Civil Engineers

PROJECT THE WORLD TRADE CENTER | TITLE SECTIONS AT SERVICE LEVEL, EL. 294' | DATE 5-1-68

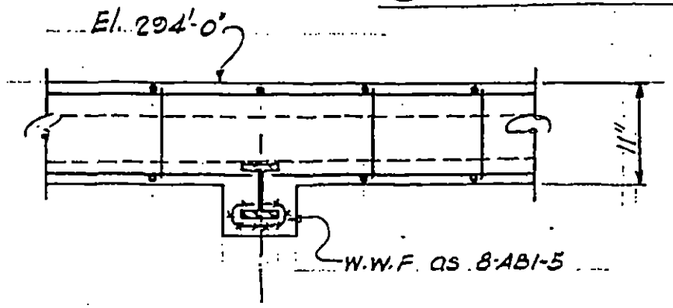
REVISIONS



Section Q-Q



Section N-N



Section P-P

Note: Sections M, N, P are similar to Section F-F on 8-AB4-13.3, except as shown on this sheet or in plan.

LICENSED PROFESSIONAL ENGINEER
LESLIE E. ROBERTSON
No. 84360
OF THE STATE OF NEW YORK

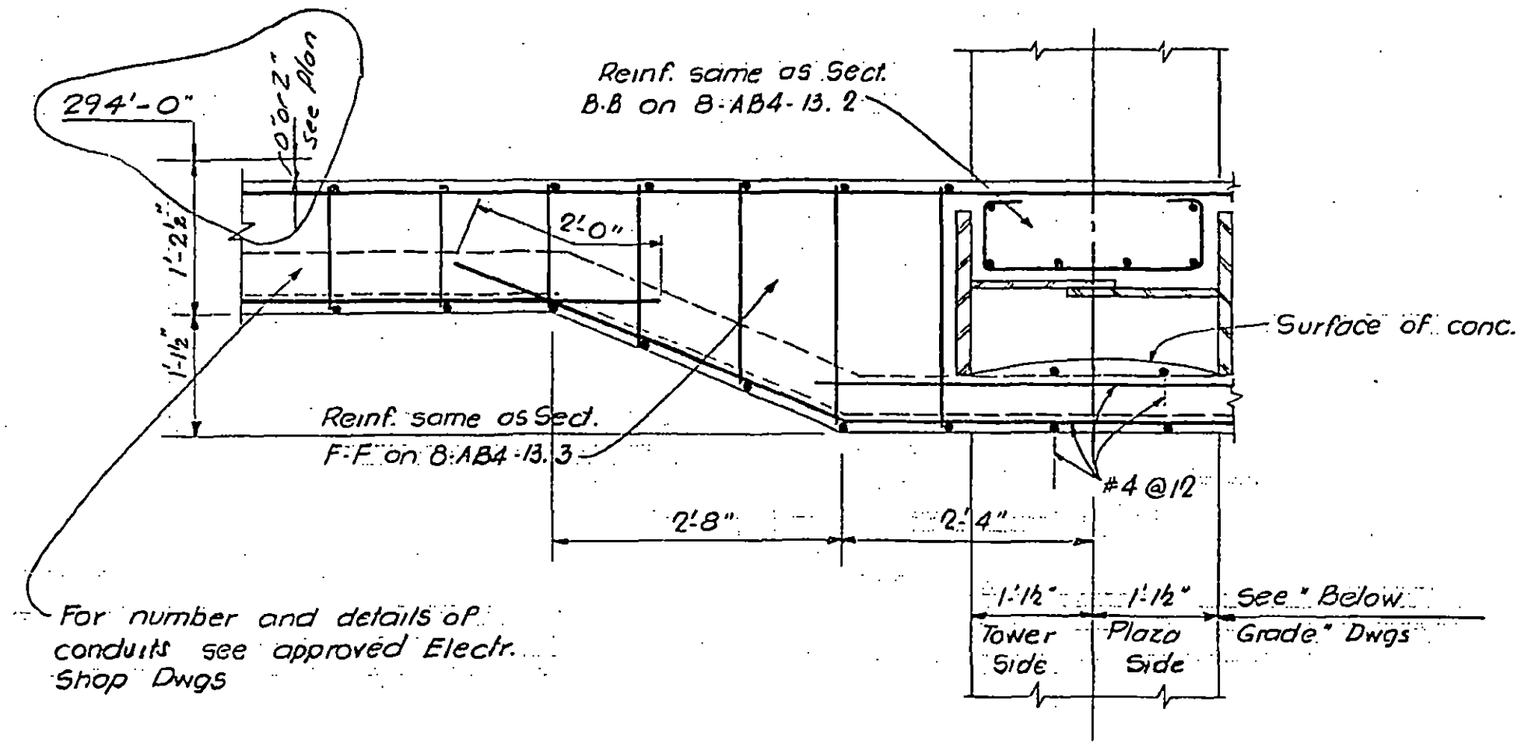
8-AB4-13.6

SKILLING - HELLE - CHRISTIANSEN - ROBERTSON Structural & Civil Engineers

PROJECT THE WORLD TRADE CENTER | TITLE SECTIONS AT SERVICE LEVEL, El. 294'-0" | DATE 5-1-68

REVISIONS

7-11-69



Section R-R

LICENSED PROFESSIONAL ENGINEER LESLIE E. ROBERTSON NEW YORK

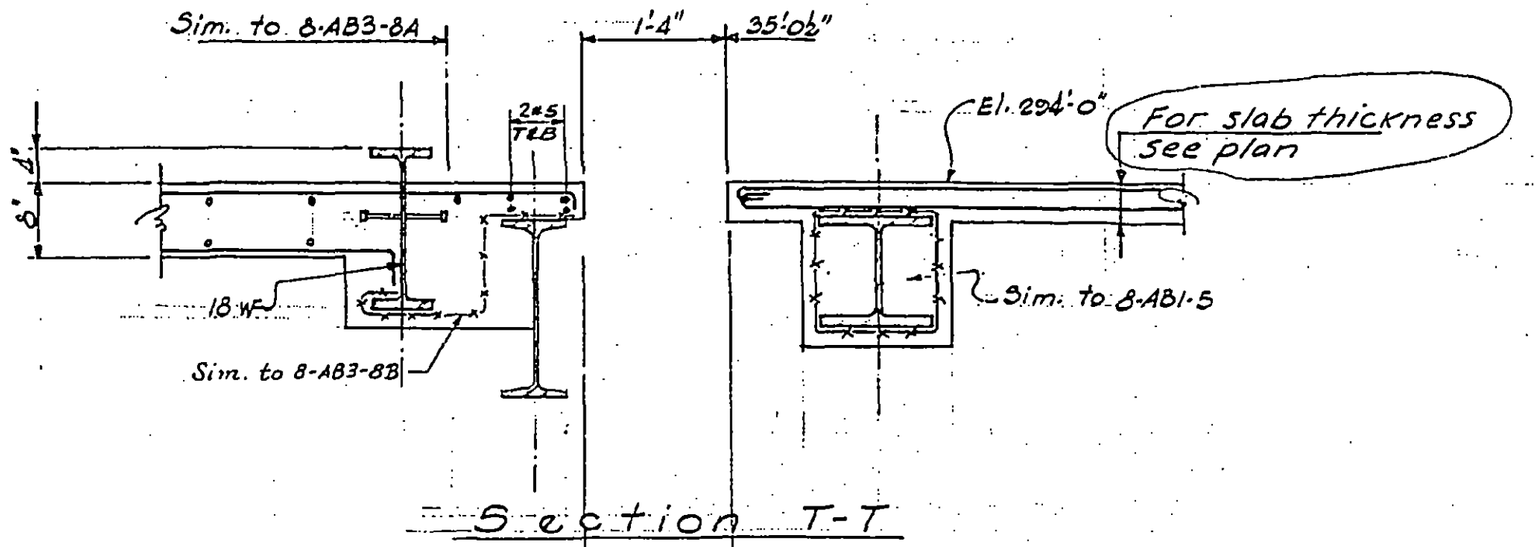
8-AB4-13.7

SKILLING - HELLE - CHRISTIANSEN - ROBERTSON Structural & Civil Engineers

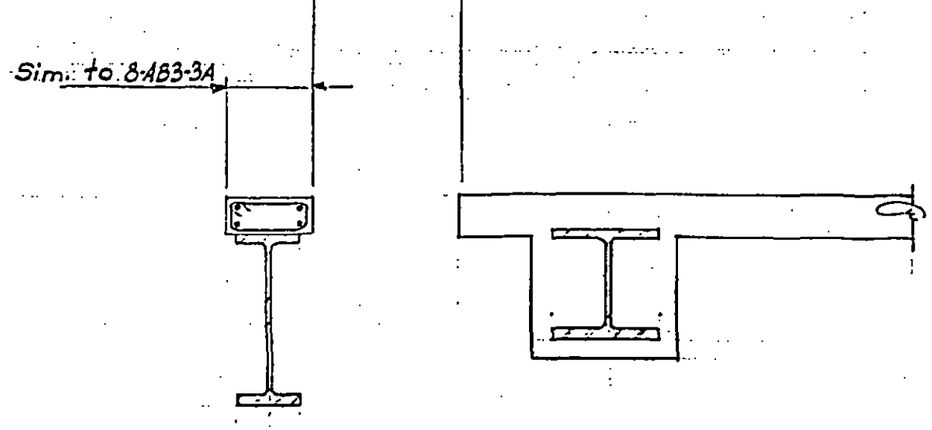
PROJECT THE WORLD TRADE CENTER | TITLE SECTIONS AT SERVICE LEVEL ; EL. 294' | DATE 5-1-68

REVISIONS

7-11-69



Section T-T



Section U-U

Similar to Section T-T except as shown

LICENSED PROFESSIONAL ENGINEER
LESLIE E. ROBERTSON
No. 84360
UNIVERSITY OF THE STATE OF NEW YORK

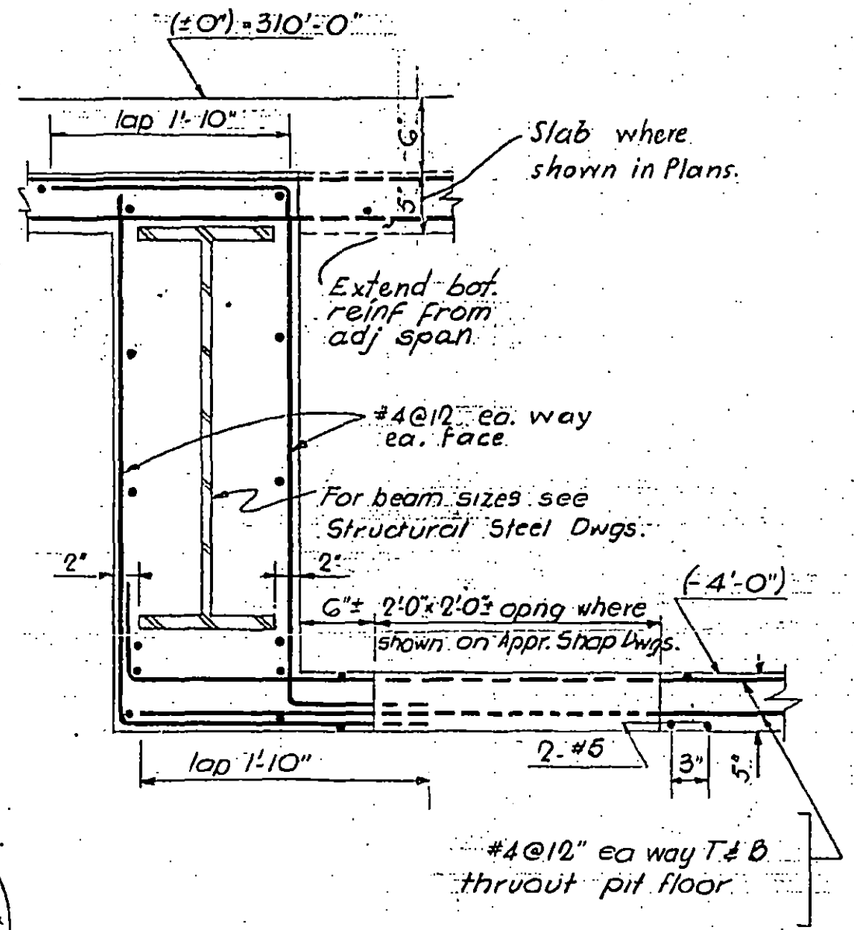
8-AB4-13.8

SKILLING - HELLE - CHRISTIANSEN - ROBERTSON Structural & Civil Engineers

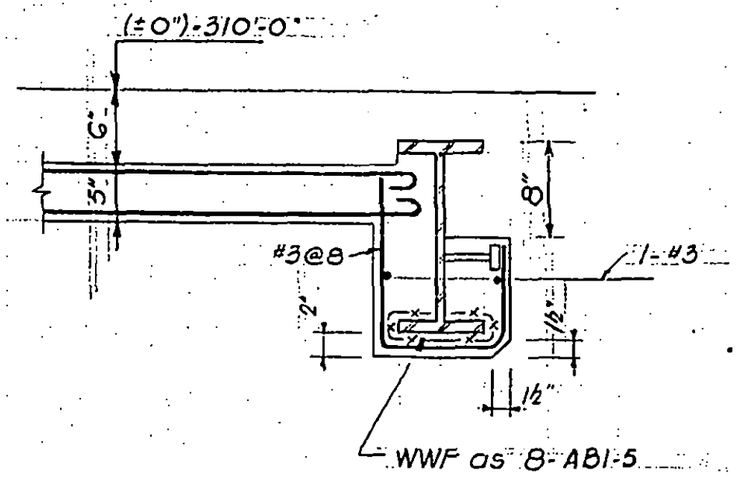
PROJECT THE WORLD TRADE CENTER | TITLE SECTIONS AT FLOOR 1, El. 310' | DATE 5-1-68

REVISIONS

7-11-69



Section A-A



Section B-B

Notes:

1. For frame of access door and other features see Archt Section C/264 and other Archt. Dwgs.
2. Check all dimensions affecting escalators with Approved Escalator Shop Dwgs.

LICENSED PROFESSIONAL ENGINEER LESLIE E. ROBERTSON No. 34360 UNIVERSITY OF THE STATE OF NEW YORK

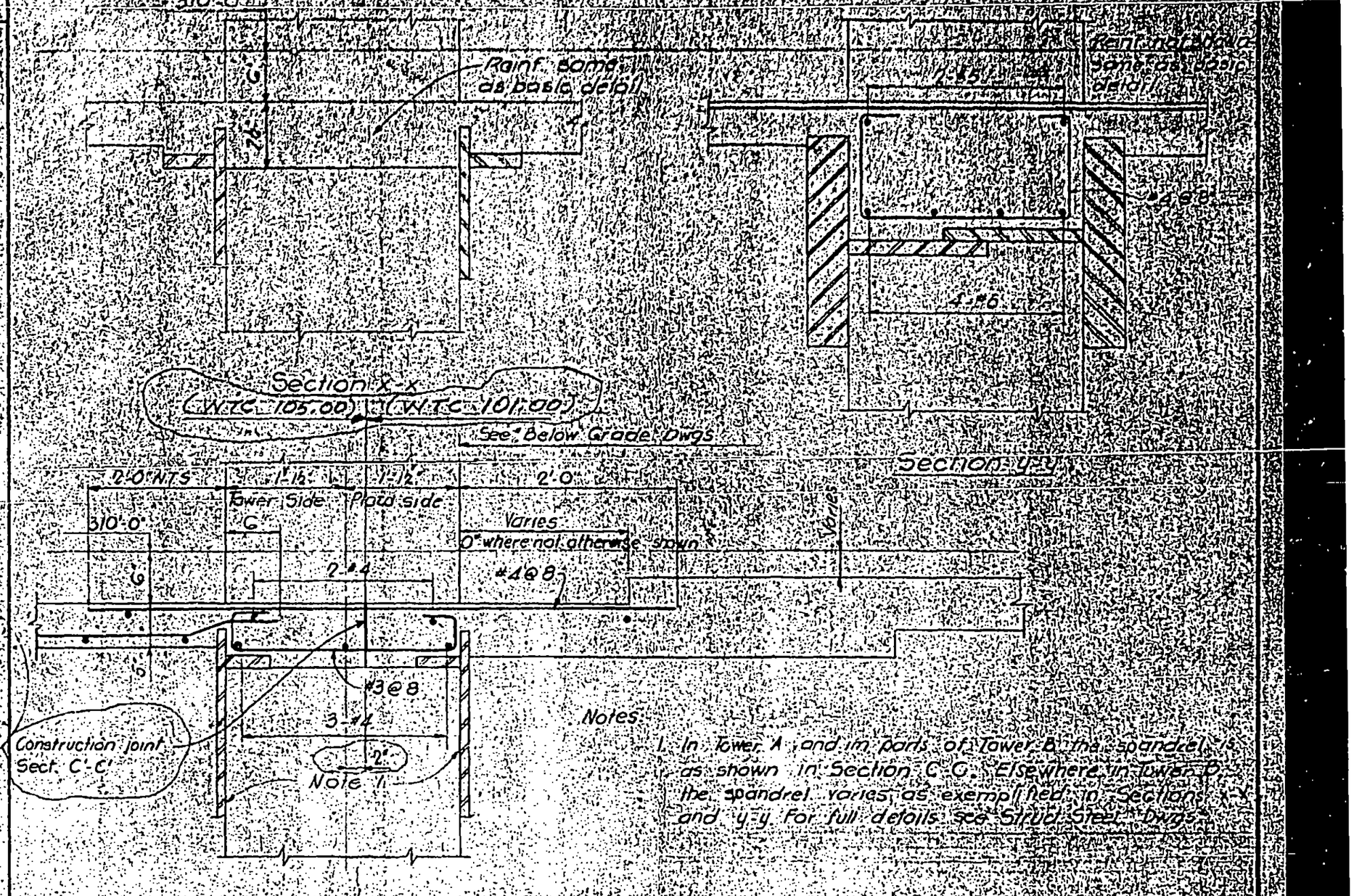
8-AB4-14.1

SKILLING HELLE CHRISTIANSEN ROBERTSON — Structural & Civil Engineers

PROJECT: THE WORLD TRADE CENTER | TITLE: SECTION AT FLOOR #1, EL. 310'-0" | DATE: 5-1-68

REVISIONS

10/21/68



LICENSED PROFESSIONAL ENGINEER
LESLIE E. ROBERTSON
No. 8360
UNIVERSITY OF THE STATE OF NEW YORK

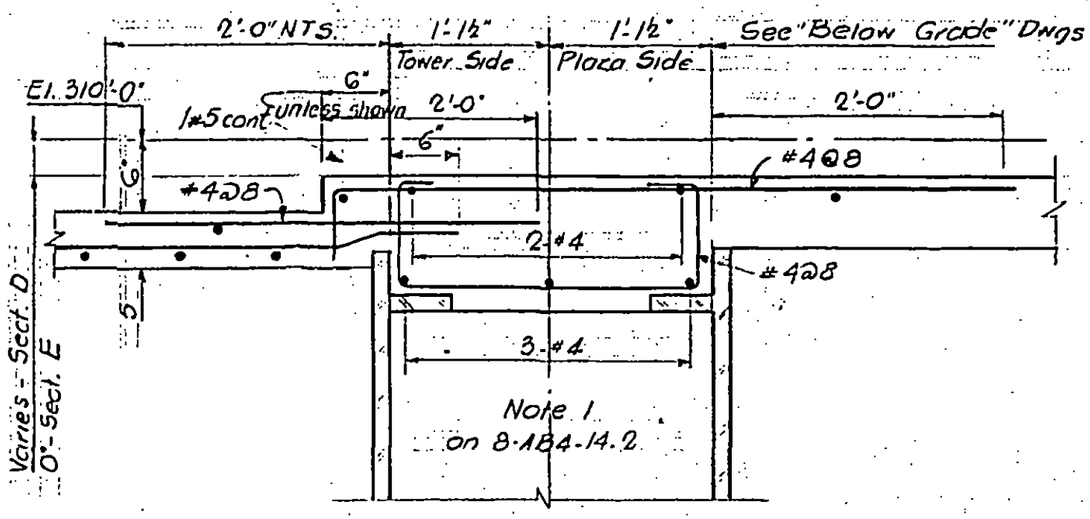
Notes:

1. In Tower A, and in parts of Tower B, the spandrel is as shown in Section C-C. Elsewhere in Tower B, the spandrel varies, as exemplified in Sections x-x and y-y. For full details see Struct. Steel Dwgs.

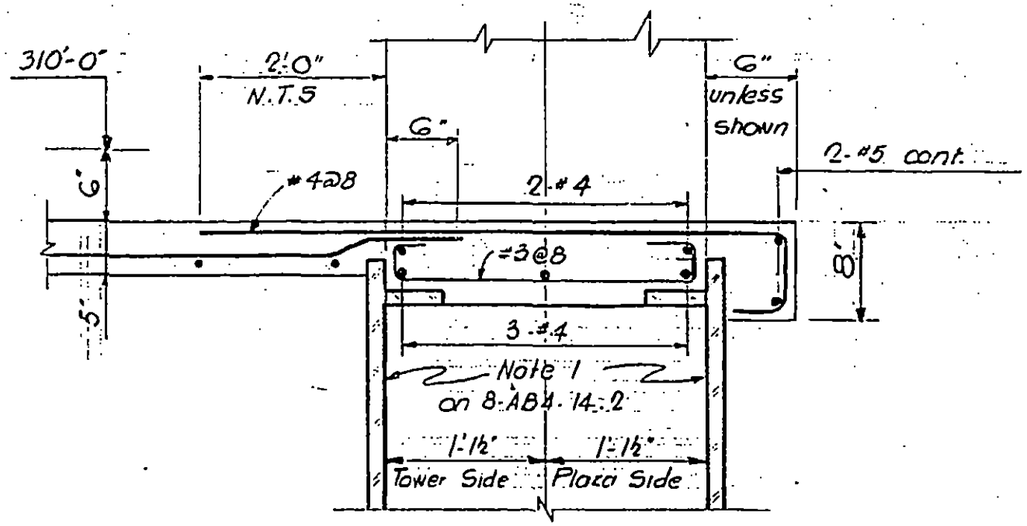
SKILLING - HELLE - CHRISTIANSEN - ROBERTSON Structural & Civil Engineers

PROJECT THE WORLD TRADE CENTER | TITLE SECTIONS AT FLOOR 1, EL. 310'-0" | DATE 5-1-68

REVISIONS



Section D-D
Section E-E



Section F-F

LICENSED PROFESSIONAL ENGINEER
LESLIE E. ROBERTSON
No. 34360
UNIVERSITY OF THE STATE OF NEW YORK

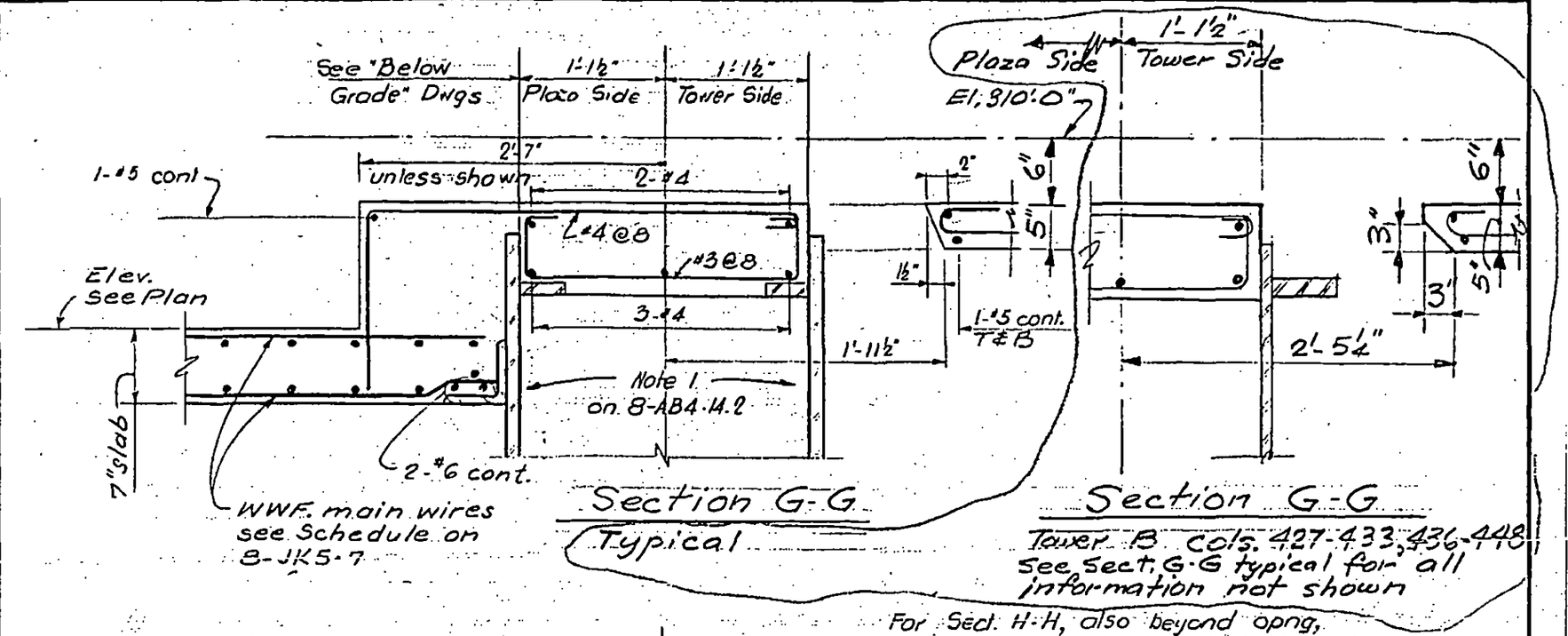
8-AB4-14.3

SKILLING - HELLE - CHRISTIANSEN - ROBERTSON Structural & Civil Engineers

PROJECT THE WORLD TRADE CENTER | TITLE SECTIONS AT FLOOR 1, EL. 310' | DATE 5-1-68

REVISIONS

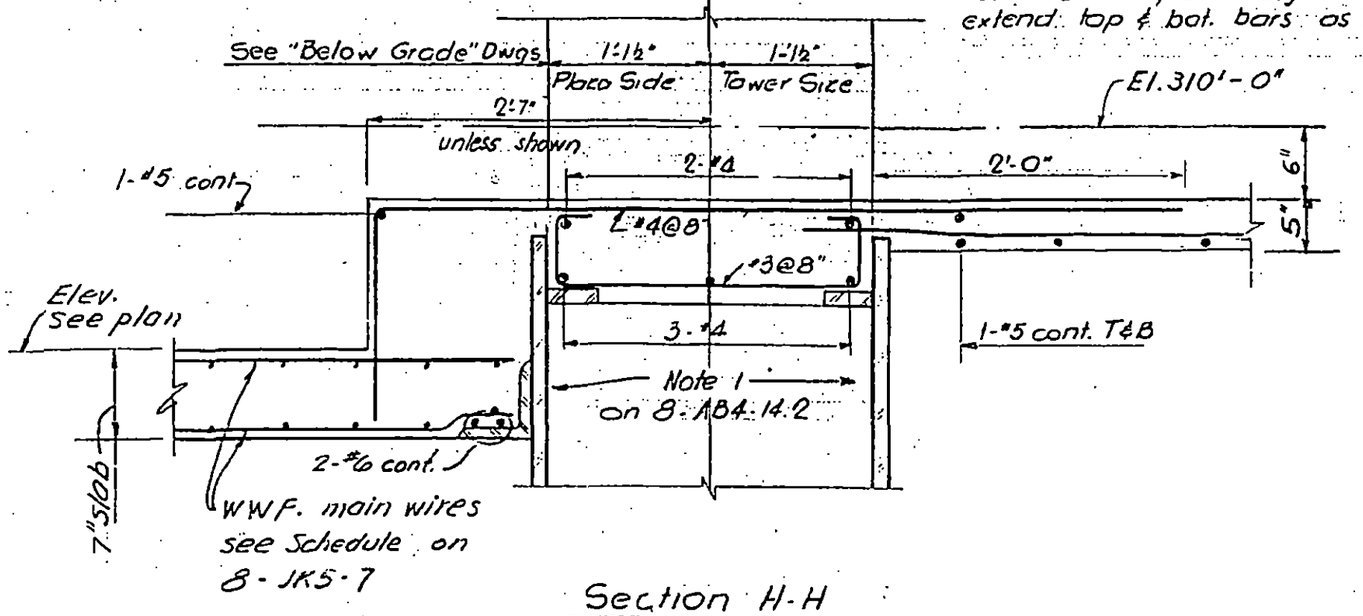
10/21/68
11/19/68
1/2/70



Section G-G
Typical

Section G-G
Tower B Cols. 427-433, 436-448
See Sect. G-G typical for all information not shown

For Sect. H-H, also beyond opng, extend top & bot. bars as shown



Section H-H

LICENSED PROFESSIONAL ENGINEER
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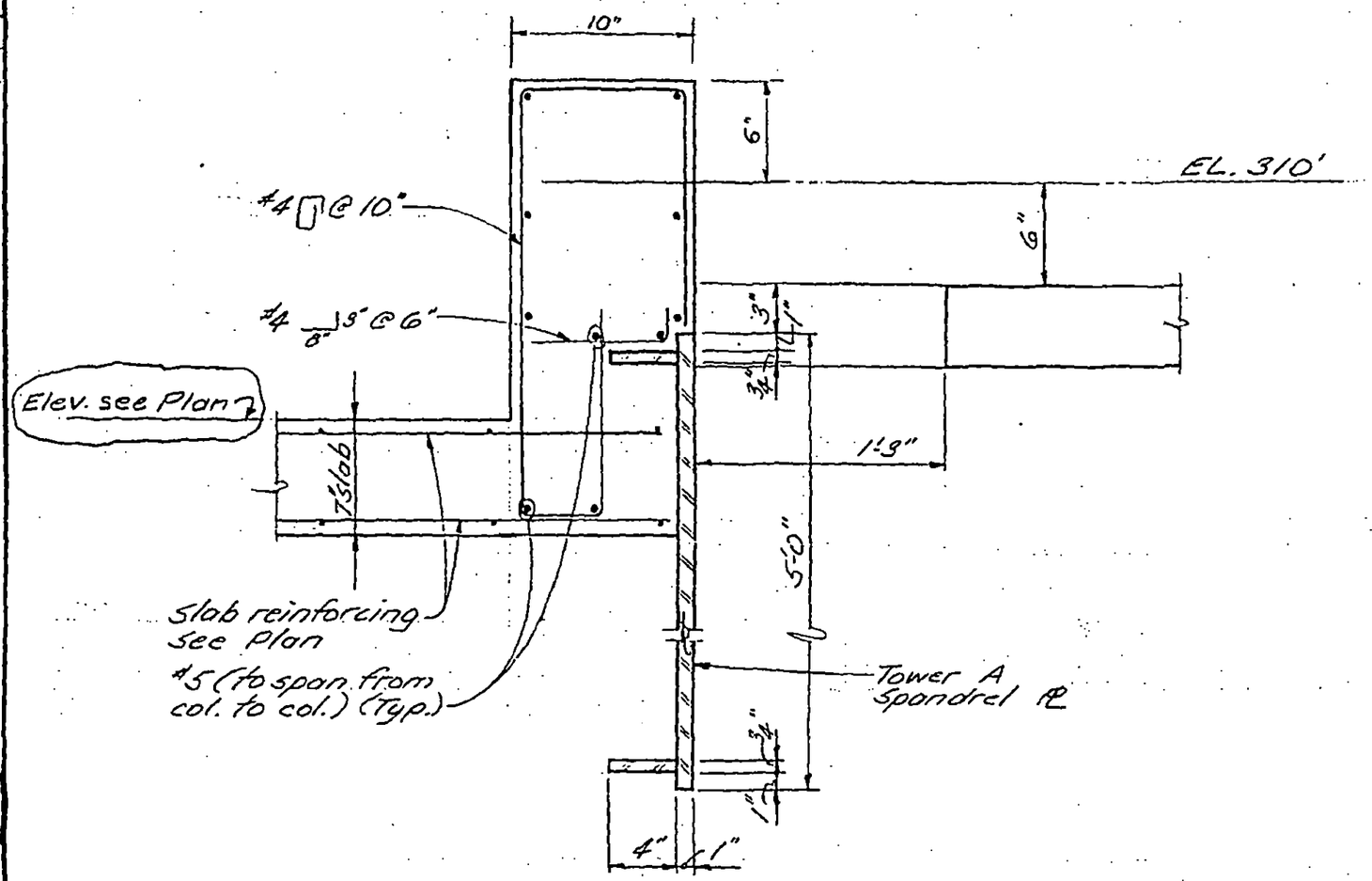
No. 34360
UNIVERSITY OF THE STATE OF NEW YORK

8-AB4-14.4

SKILLING, HELLE, CHRISTIANSEN, ROBERTSON — Structural & Civil Engineers

PROJECT: THE WORLD TRADE CENTER | TITLE: SECTIONS AT FLOOR 1, EL. 310' | DATE: 10-21-66

REVISIONS
12-9-68
1-17-69



Section J-J

LICENSED PROFESSIONAL ENGINEER
LESLIE E. ROBERTSON
NO. 54360
UNIVERSITY OF THE STATE OF NEW YORK

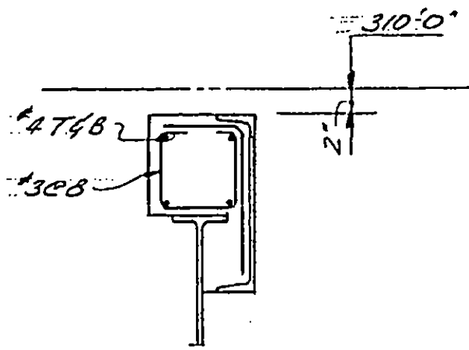
DESIGNED
DRAWN S.C.
REVIEWED E.L.

8-AB4-14.5

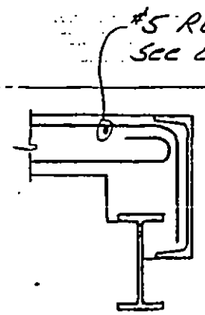
SKILLING, HELLE, CHRISTIANSEN, ROBERTSON — Structural & Civil Engineers

PROJECT: THE WORLD TRADE CENTER | TITLE: SECTIONS AT FLOOR 1, EL 310' | DATE: 7-11-69

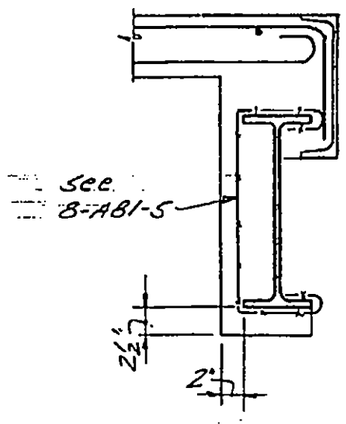
REVISIONS



SECTION K-K

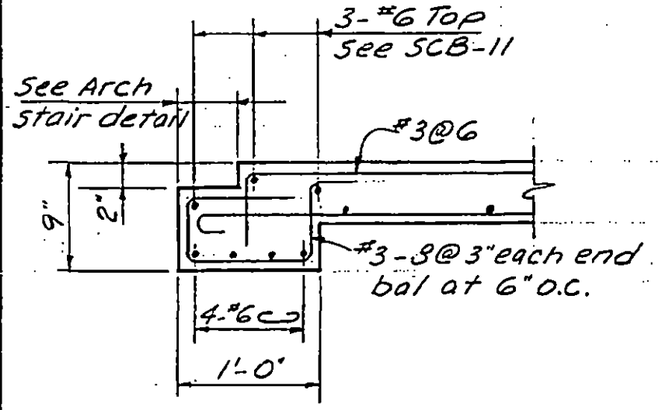


SECTION L-L



SECTION M-M

Note to Sections K, L & M:
Use pea gravel concrete wherever space between channel and top flange of beam is 1½" or less.



Section N-N

LICENSED PROFESSIONAL ENGINEER
LESLIE E. ROBERTSON
No. 34360
UNIVERSITY OF THE STATE OF NEW YORK

DESIGNED

DRAWN
J. Adams

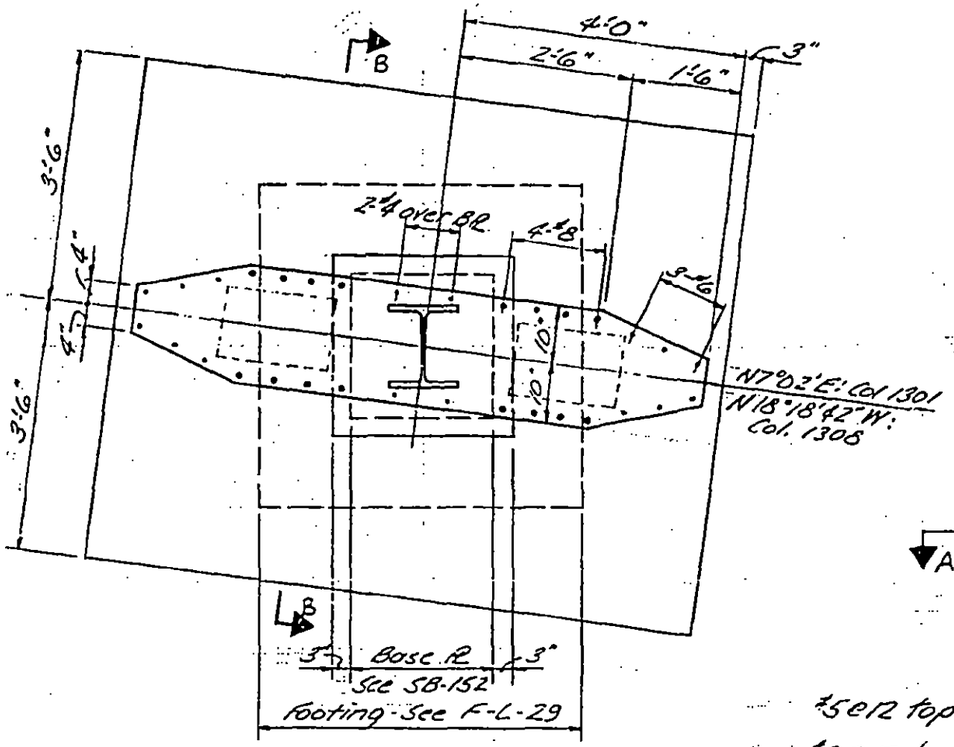
REVIEWED

8-AB4-14.6

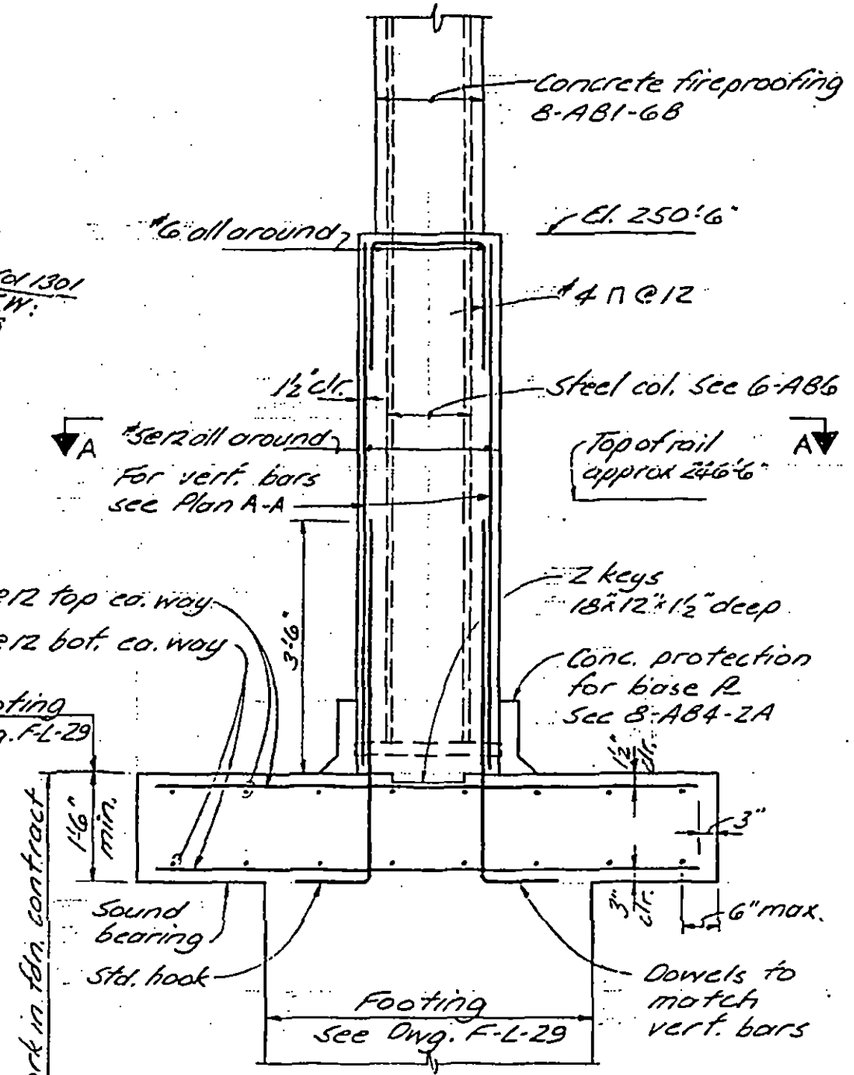
SKILLING, HELLE, CHRISTIANSEN, ROBERTSON — Structural & Civil Engineers

PROJECT: THE WORLD TRADE CENTER | TITLE: BUFFER WALLS | DATE: 3-25-69

REVISIONS



Sectional Plan A-A
Col. 1301 shown
Col. 1308 similar



Section B-B

LICENSED PROFESSIONAL ENGINEER
LESLIE E. ROBERTSON
No. 34360
UNIVERSITY OF THE STATE OF NEW YORK

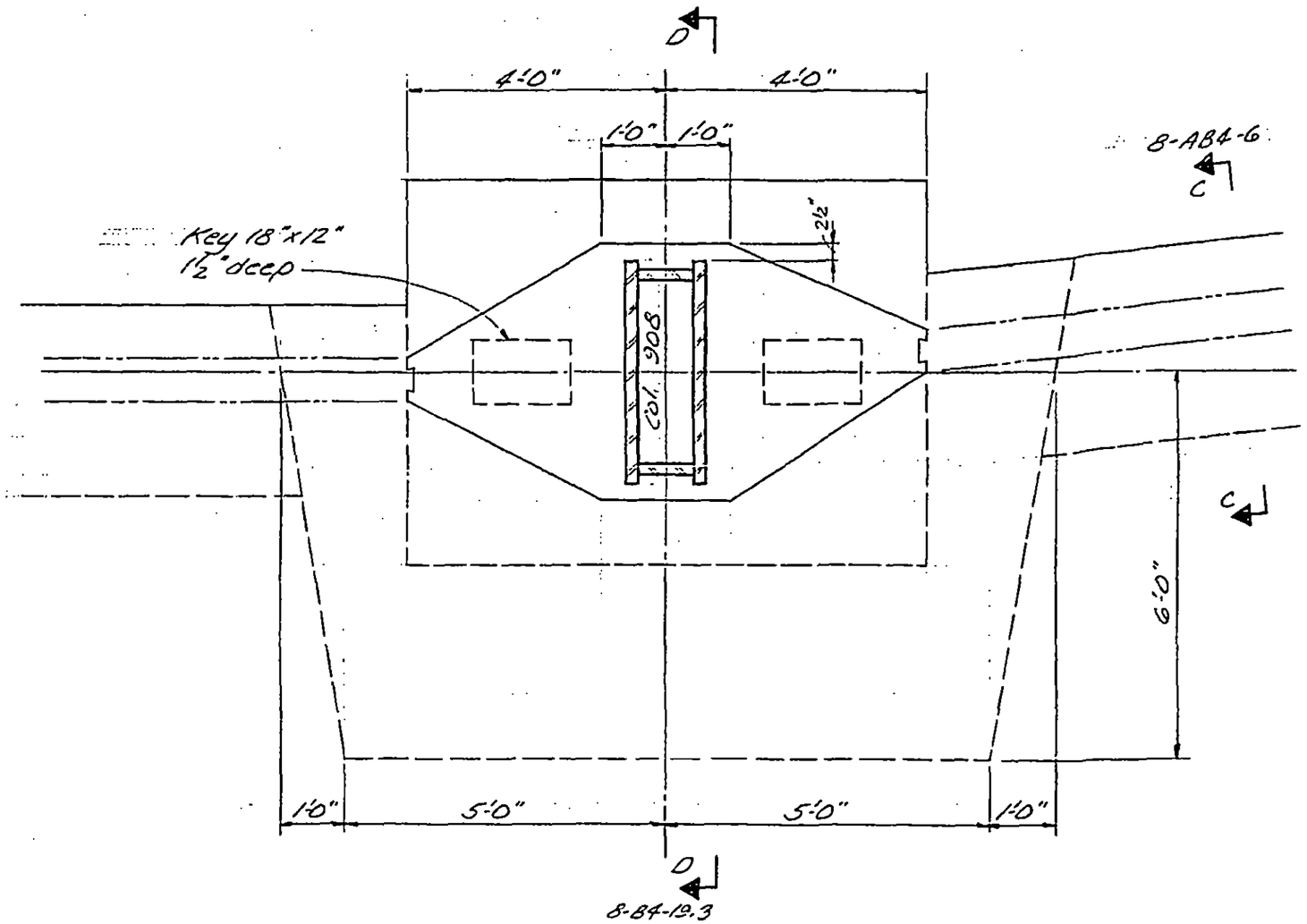
DESIGNED: A.L.A.
DRAWN: J. Adams
REVIEWED:

8-B4-19.1

SKILLING, HELLE, CHRISTIANSEN, ROBERTSON — Structural & Civil Engineers

PROJECT THE WORLD TRADE CENTER | TITLE BUFFER WALLS | DATE 3-25-69

REVISIONS



Sectional Plan C-C

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LESLIE E. ROBERTSON
No. 34360
UNIVERSITY OF THE STATE OF NEW YORK

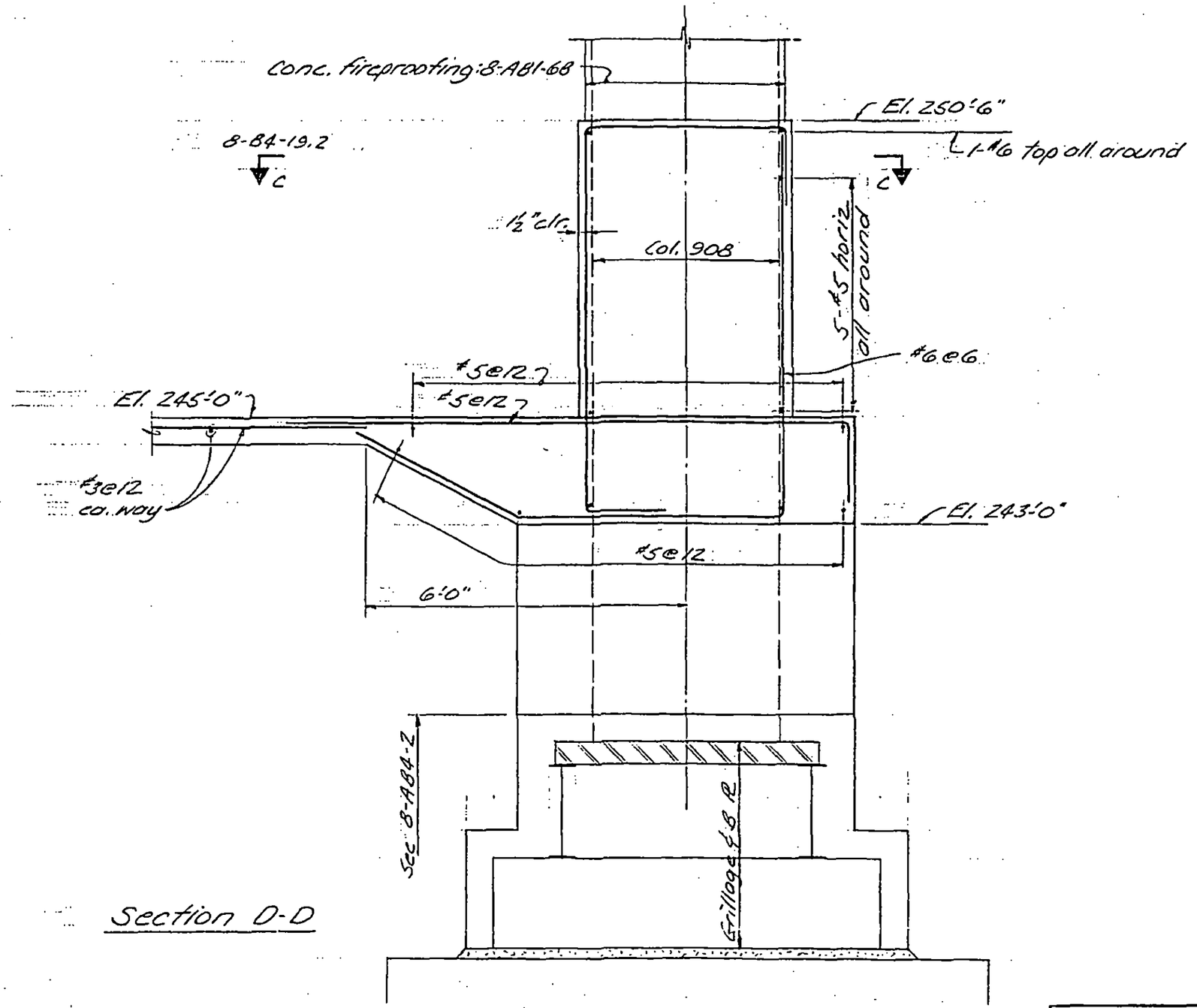
DESIGNED A.L.A
DRAWN J. Adams
REVIEWED

8-B4-19.2

SKILLING, HELLE, CHRISTIANSEN, ROBERTSON — Structural & Civil Engineers

PROJECT: THE WORLD TRADE CENTER | TITLE: BUFFER WALLS | DATE: 3-25-69

REVISIONS



Section O-D

LICENSED PROFESSIONAL ENGINEER
LESLIE E. ROBERTSON
No. 34360
UNIVERSITY OF THE STATE OF NEW YORK

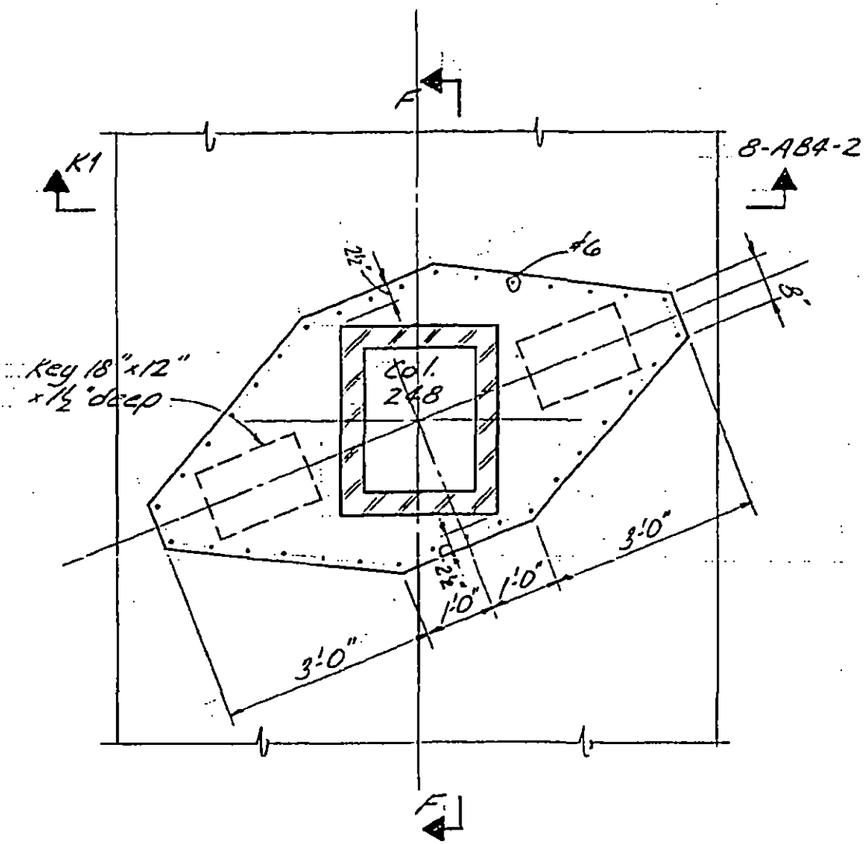
DESIGNED: A.L.A.
DRAWN: J. Adams
REVIEWED:

8-B4-19.3

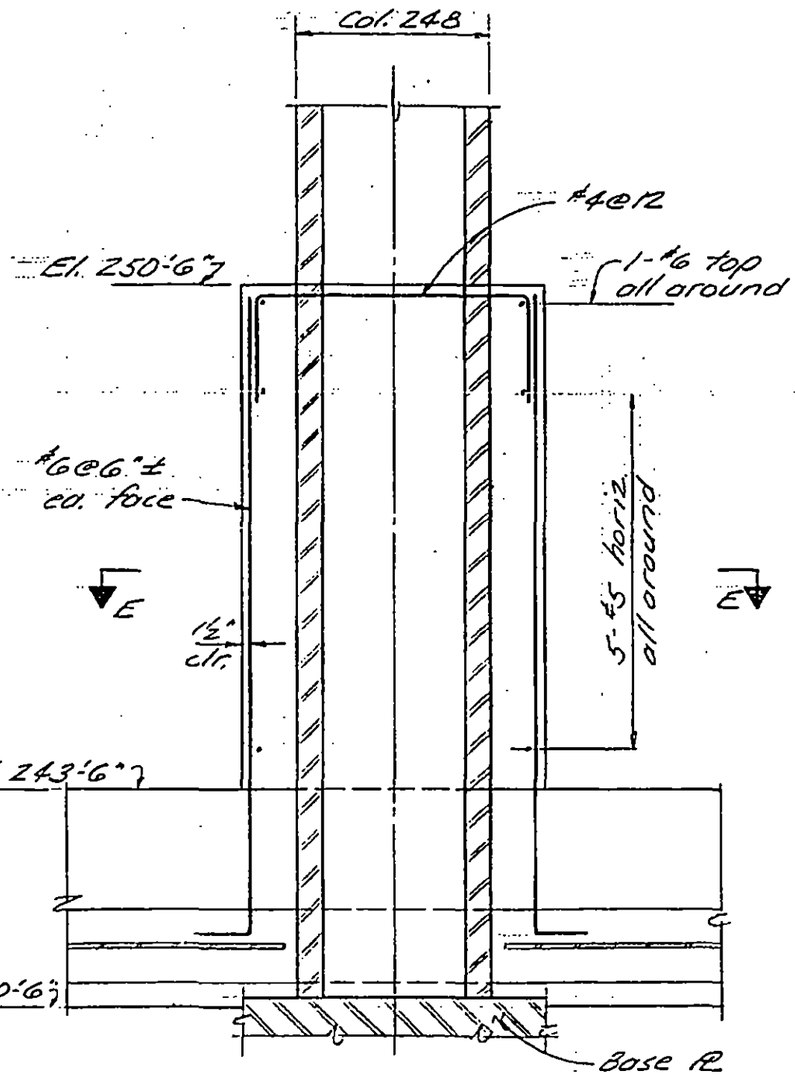
SKILLING, HELLE, CHRISTIANSEN, ROBERTSON — Structural & Civil Engineers

PROJECT: THE WORLD TRADE CENTER | TITLE: BUFFER WALLS | DATE: 3-25-69

REVISIONS



Sectional Plan E-E



Section F-F

LICENSED PROFESSIONAL ENGINEER — LESLIE E. ROBERTSON — No. 34360 — UNIVERSITY OF THE STATE OF NEW YORK

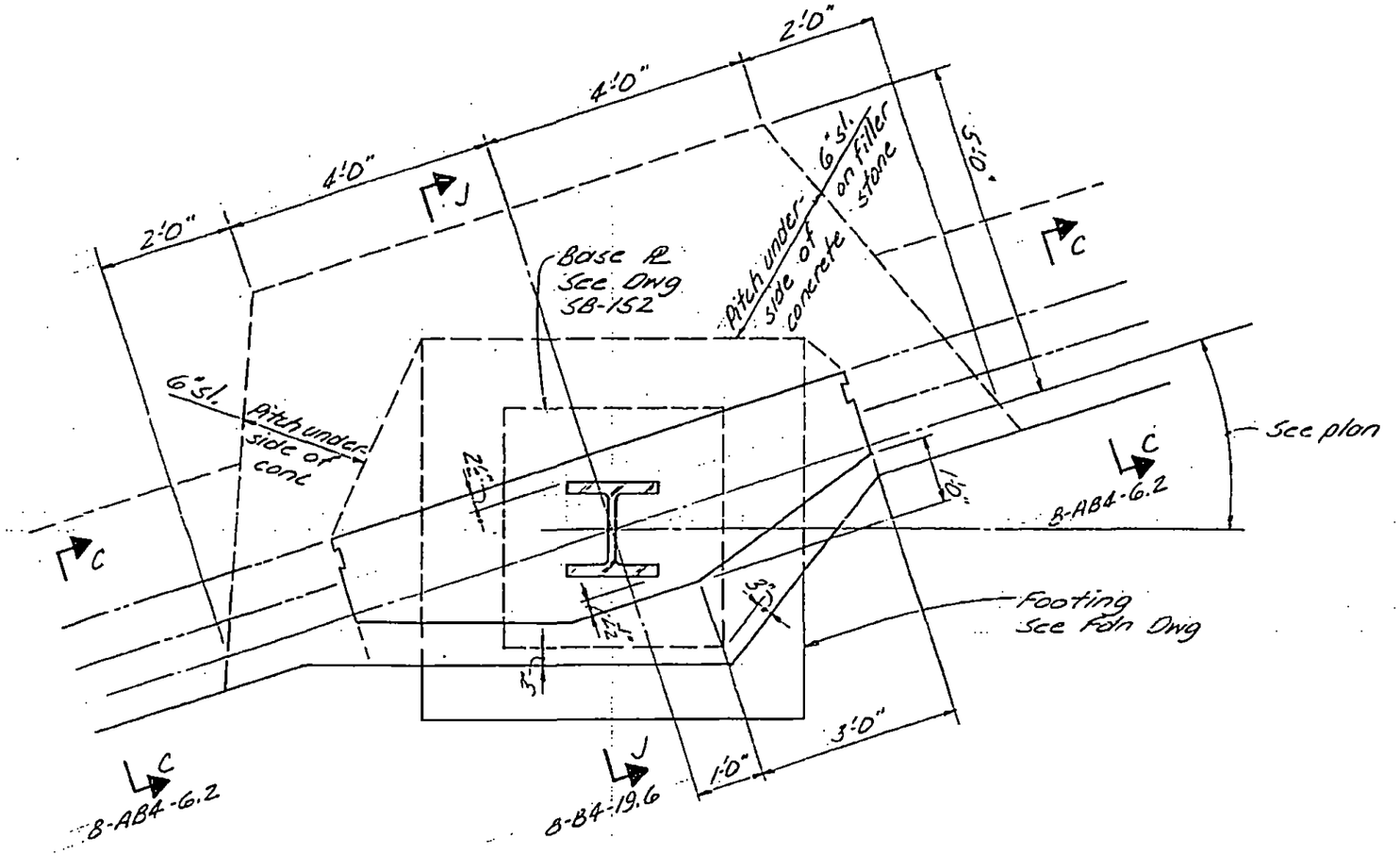
DESIGNED: A.L.A.
DRAWN: J. Adams
REVIEWED:

8-84:19.4

SKILLING, HELLE, CHRISTIANSEN, ROBERTSON — Structural & Civil Engineers

PROJECT: THE WORLD TRADE CENTER | TITLE: BUFFER WALLS | DATE: 3-25-69

REVISIONS



Sectional Plan G-G

Col. 1207 shown
Cols. 1205, 1206 similar

LICENSED PROFESSIONAL ENGINEER
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UNIVERSITY OF THE STATE OF NEW YORK

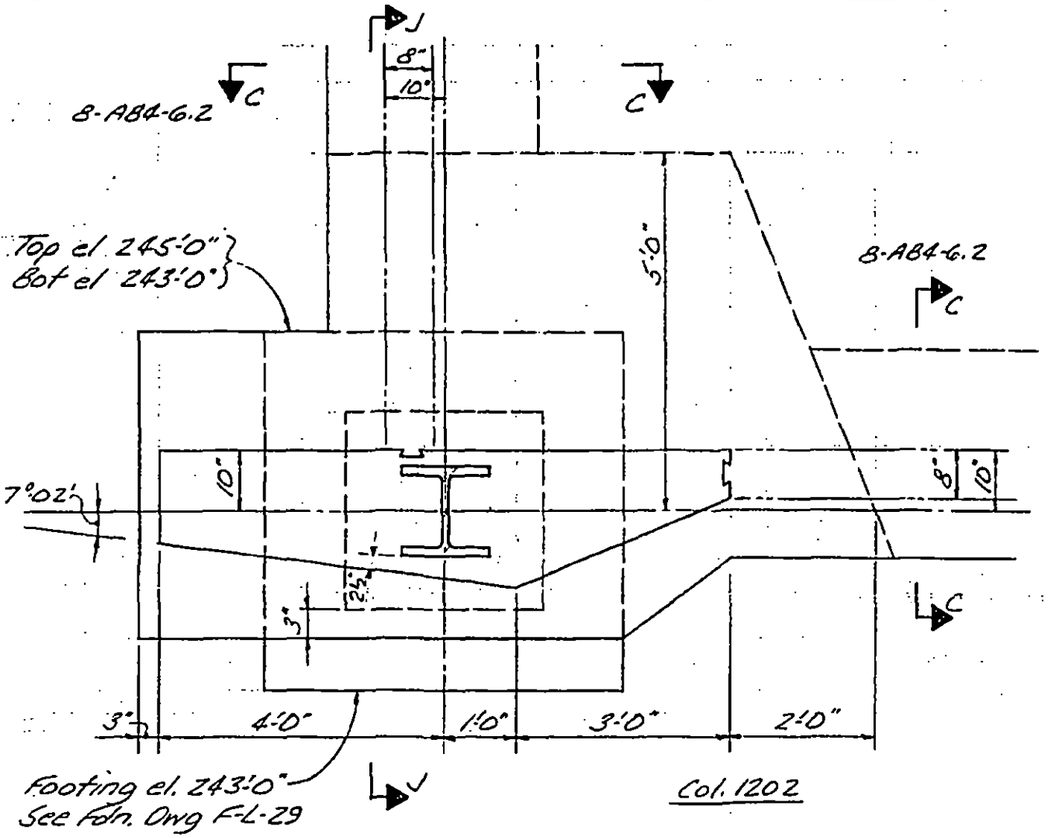
DESIGNED: A.L.A.
DRAWN: J. Adams
REVIEWED:

8-B4-19.5

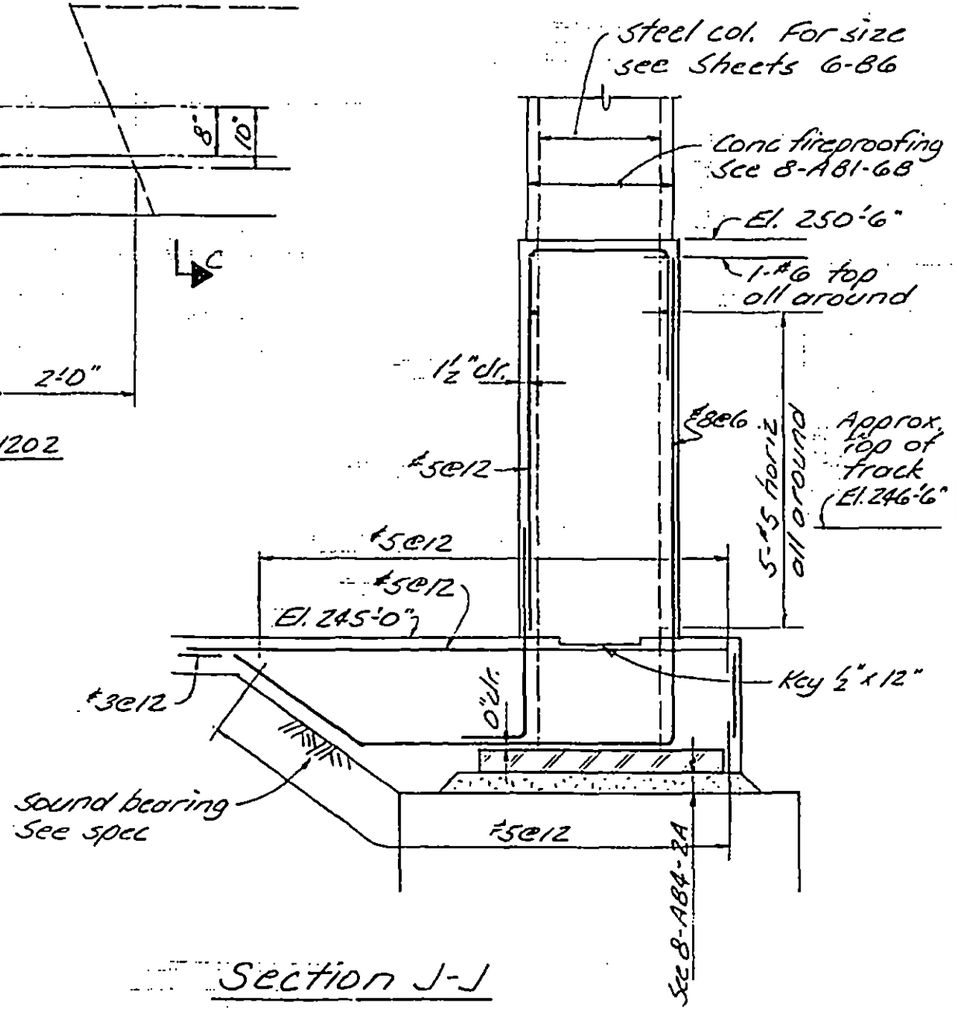
SKILLING, HELLE, CHRISTIANSEN, ROBERTSON — Structural & Civil Engineers

PROJECT: THE WORLD TRADE CENTER | TITLE: BUFFER WALLS | DATE: 3-25-69

REVISIONS



Sectional Plan H-H



Section J-J

8-84-19.6

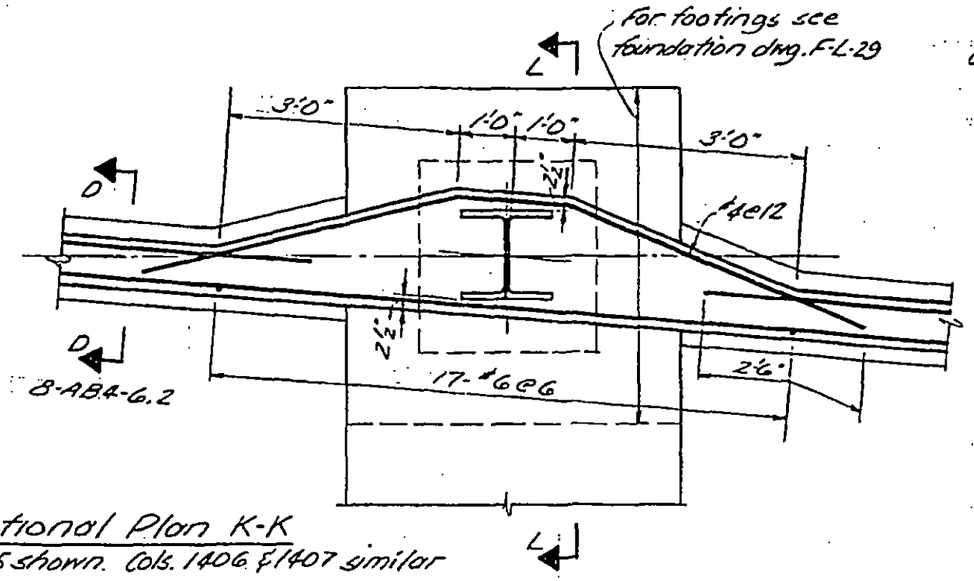
LICENSED PROFESSIONAL ENGINEER — LESLIE E. ROBERTSON — No. 34360 — UNIVERSITY OF THE STATE OF NEW YORK

DESIGNED A.L.A.
DRAWN J. Adams
REVIEWED

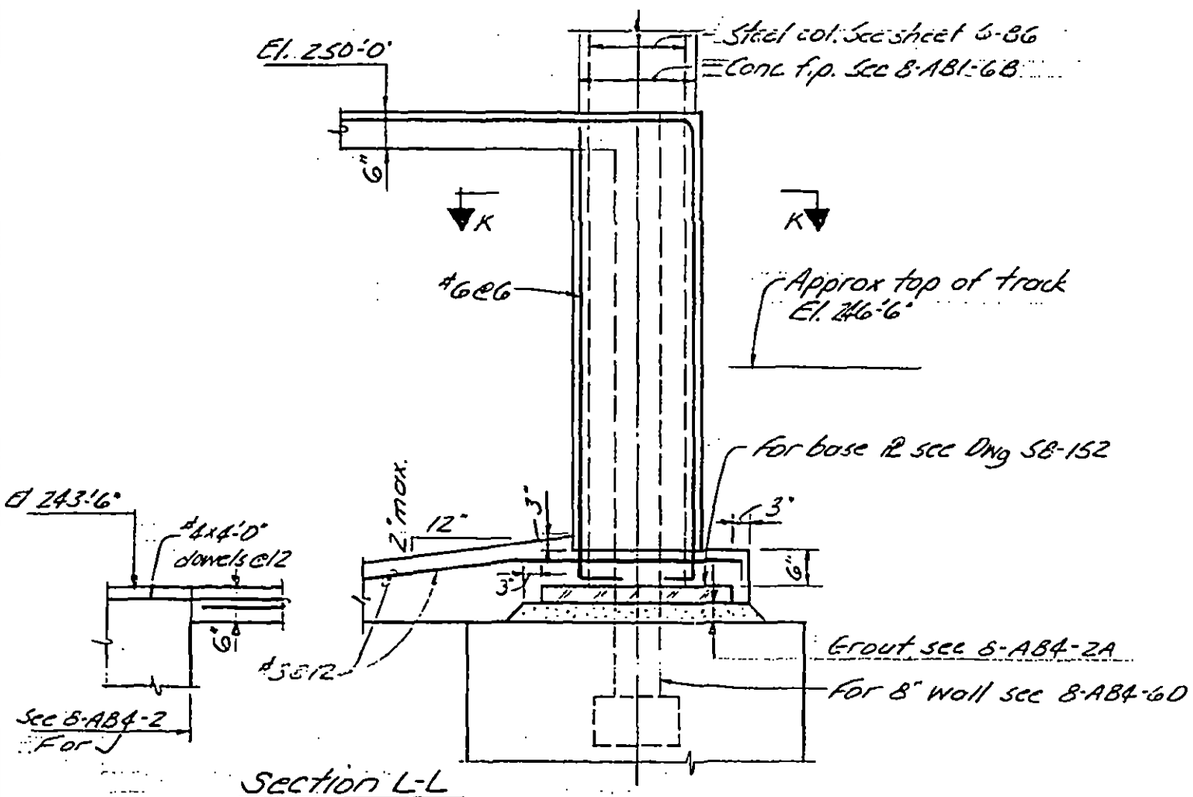
SKILLING, HELLE, CHRISTIANSEN, ROBERTSON — Structural & Civil Engineers

PROJECT THE WORLD TRADE CENTER | TITLE BUFFER WALLS | DATE 3-25-69

REVISIONS



Sectional Plan K-K
Col. 1405 shown. Cols. 1406 & 1407 similar



Section L-L

Notes:

1. Reinforcing not shown same as Sect. D on 8-AB4-6.2
2. Where construction must be carried out in two stages, use Det. 8-AB4-20D

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DESIGNED A.L.A.
DRAWN J. Adams
REVIEWED

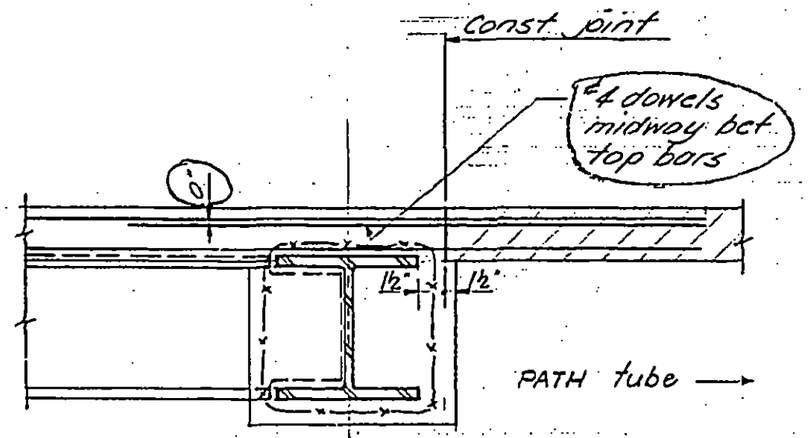
8-B4-19.7

SKILLING - HELLE - CHRISTIANSEN - ROBERTSON Structural & Civil Engineers

PROJECT THE WORLD TRADE CENTER | TITLE CONSTRUCTION JOINTS AT EXIST. PATH TUBE | DATE 5-1-68

REVISIONS

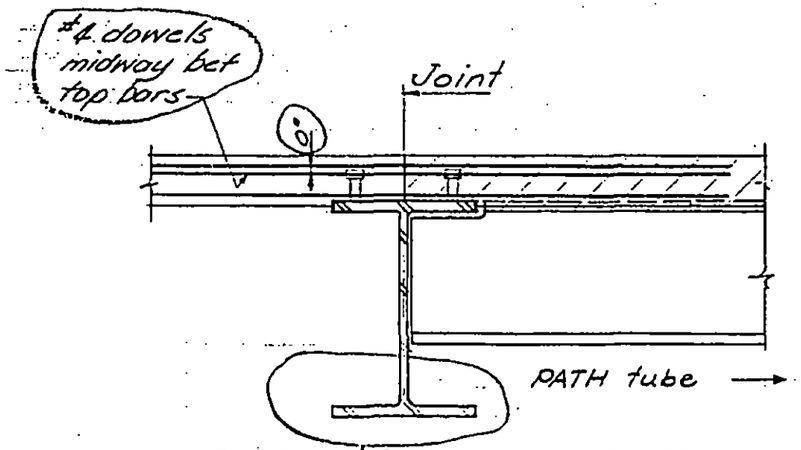
8-20-68
4-25-69



For reinf and dimensions of F.P. See 8-AB1-5

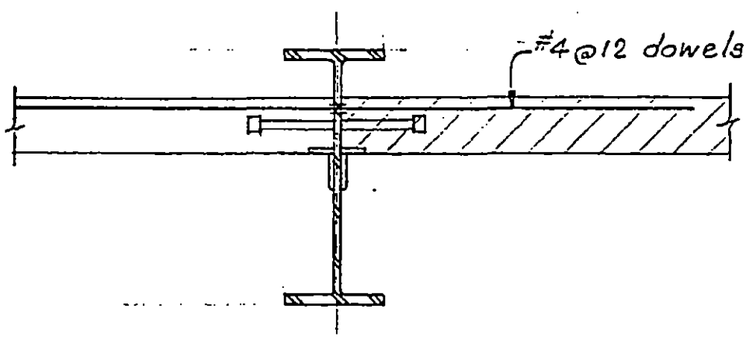
Section A-A

Typical where there are no beams normal to joint on PATH tube side.



Section B-B

(Typical for joint over deep beam)



Section C-C

Typical where steel flange is above slab.

Notes:

1. Top and bottom reinforcing as noted or shown in plan.
2. Hatching indicates concrete placed last.
3. Bars crossing joint shall be bent parallel to the concrete surface as required to clear PATH tube, caissons, and other obstructions, and carefully re-straightened before placing concrete on PATH tube side.

LICENSED PROFESSIONAL ENGINEER
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UNIVERSITY OF THE STATE OF NEW YORK

8-AB4-20.1

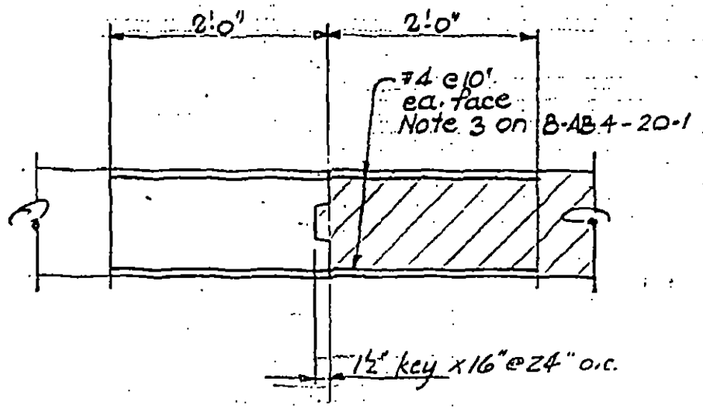
SKILLING - HELLE - CHRISTIANSEN - ROBERTSON Structural & Civil Engineers

PROJECT THE WORLD TRADE CENTER | TITLE CONSTRUCTION JOINTS AT EXISTING PATH TUBE | DATE 5-1-68

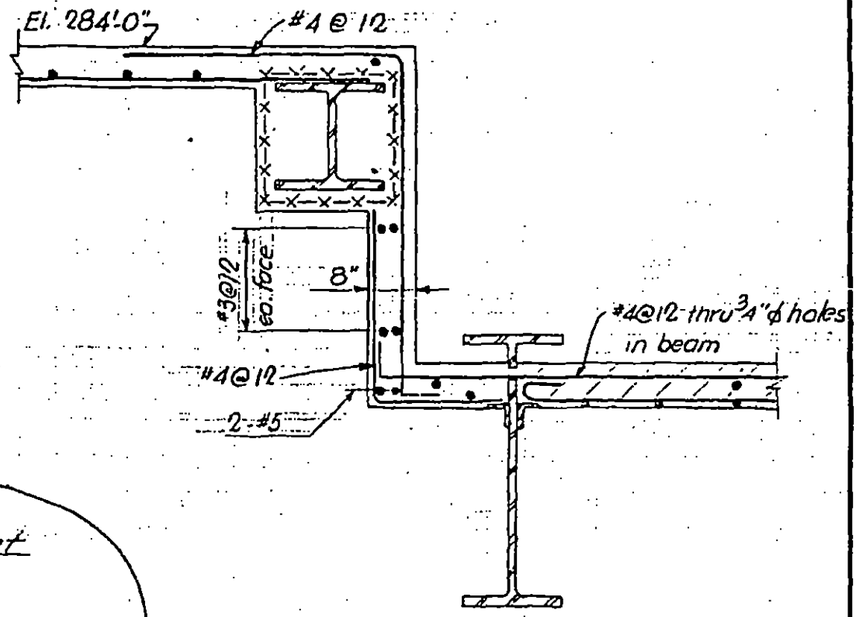
REVISIONS

4-25-69

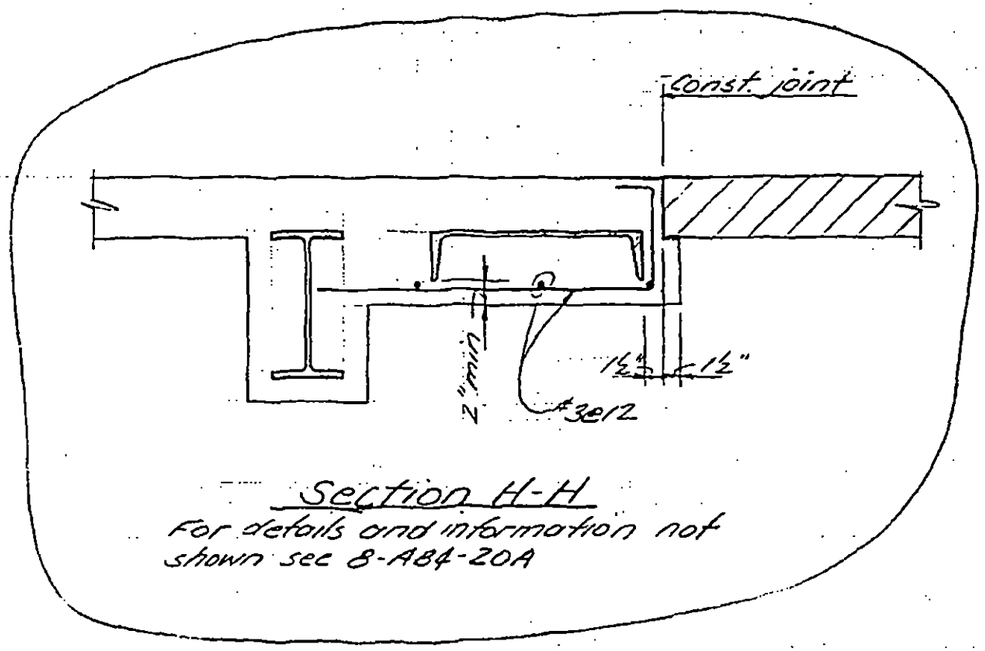
8-5-69



Sectional Plan D-D
Typical for concrete walls



Section E-E



Section H-H
For details and information not shown see B-AB4-20A

LICENSED PROFESSIONAL ENGINEER
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UNIVERSITY OF THE STATE OF NEW YORK

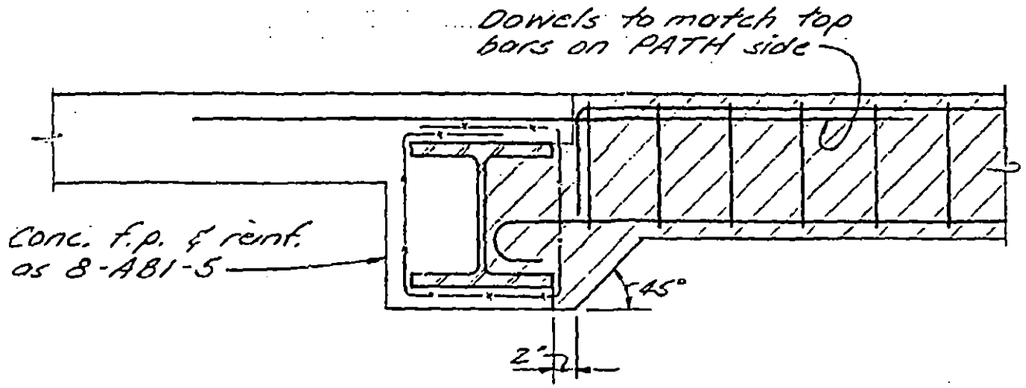
W.A. Brewer

B-AB4-20.2

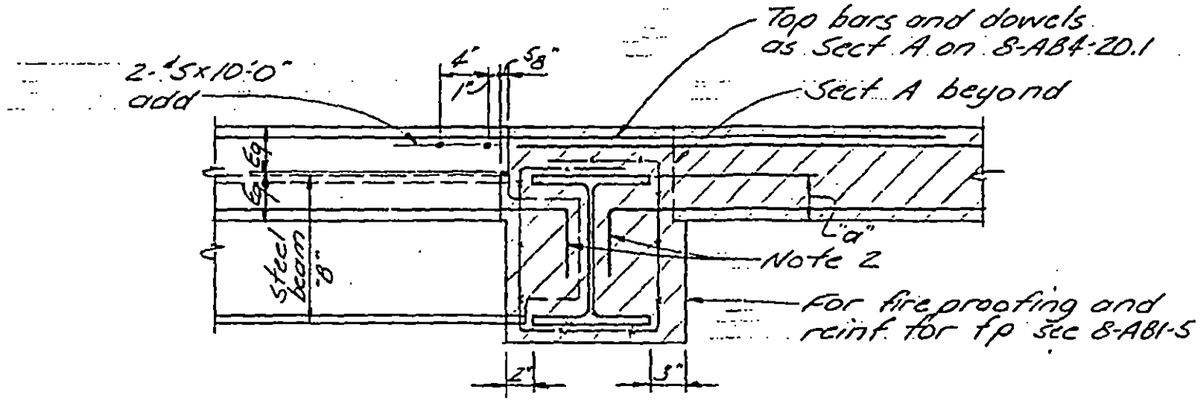
SKILLING, HELLE, CHRISTIANSEN, ROBERTSON — Structural & Civil Engineers

PROJECT: THE WORLD TRADE CENTER | TITLE: CONSTRUCTION JOINTS AT EXISTING PATH TUBE | DATE: 4-25-69

REVISIONS



Section F-F



Section G-G

Notes to Sect. G-G:

1. Use this sect for a length of 5'-0" centered on steel beam "B"
2. Where depth of slab soffit below steel flange (dimension "a") is 2" or less, extend bottom steel across joint; do not hook

LICENSED PROFESSIONAL ENGINEER — LESLIE E. ROBERTSON — No. 34360 — UNIVERSITY OF THE STATE OF NEW YORK

DESIGNED: A.L.A.

DRAWN: J. Arlams

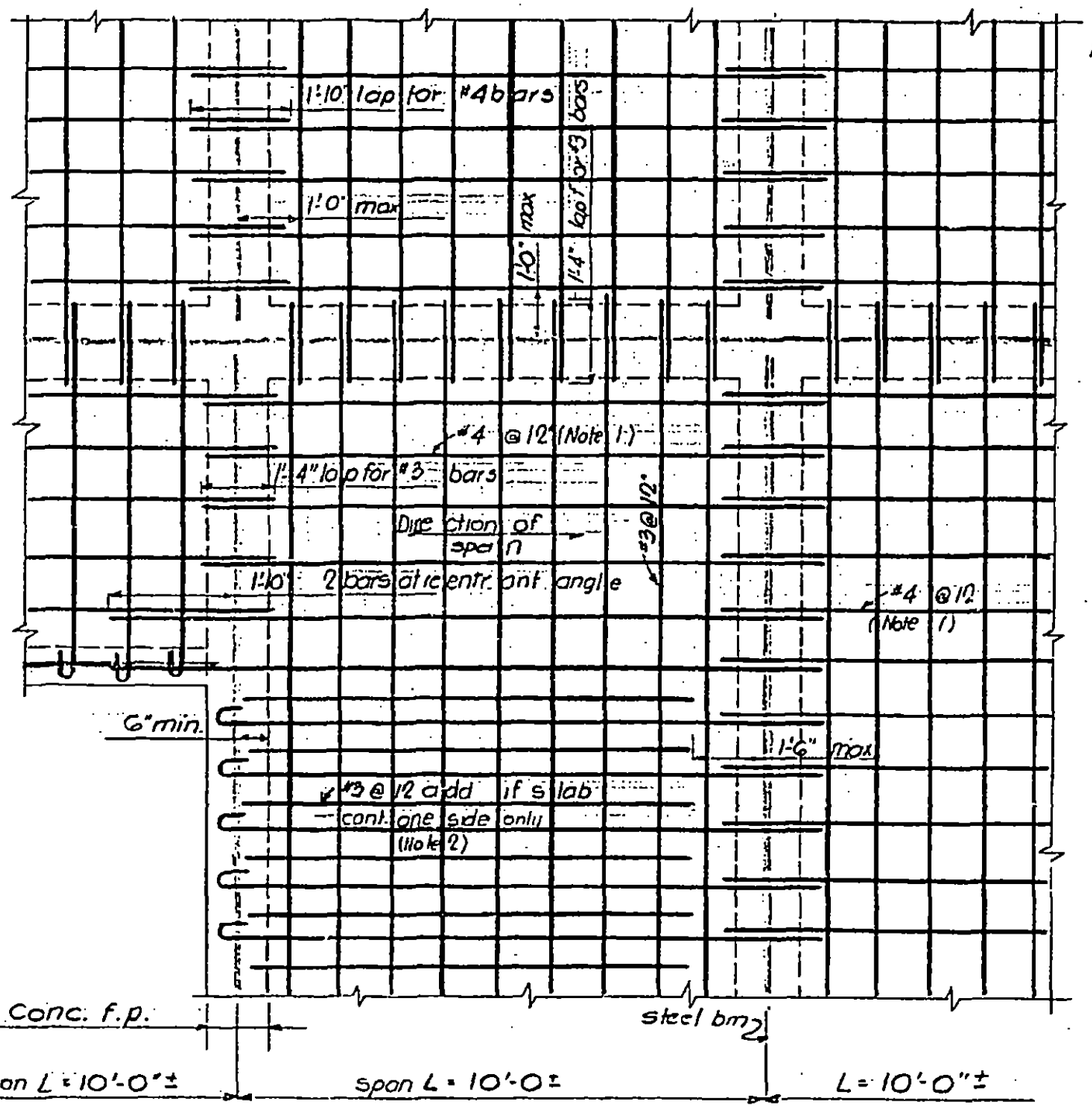
REVIEWED:

SKILLING - HELLE - CHRISTIANSEN - ROBERTSON Structural & Civil Engineers

PROJECT THE WORLD TRADE CENTER | TITLE TYPICAL SLAB AT El. 274', 184', 94', 310' | DATE 5-1-68

REVISIONS

8-20-68



Bottom Bars

Notes:

1. For spans "L" 8'-0" or less, and in slabs 12'-0" 10'-0" or less, use #3@12" instead of #4@12"
2. Omit #3@12" added bars where span "L" is 6'-0" or less
3. Bars in direction of span placed in bottom layer
4. Splices are shown schematically. Actually, splices are to be staggered, see 8-AB1-2.2, Note #5.

LICENSED PROFESSIONAL ENGINEER LESLIE E. ROBERTSON No. 34360 STATE OF NEW YORK

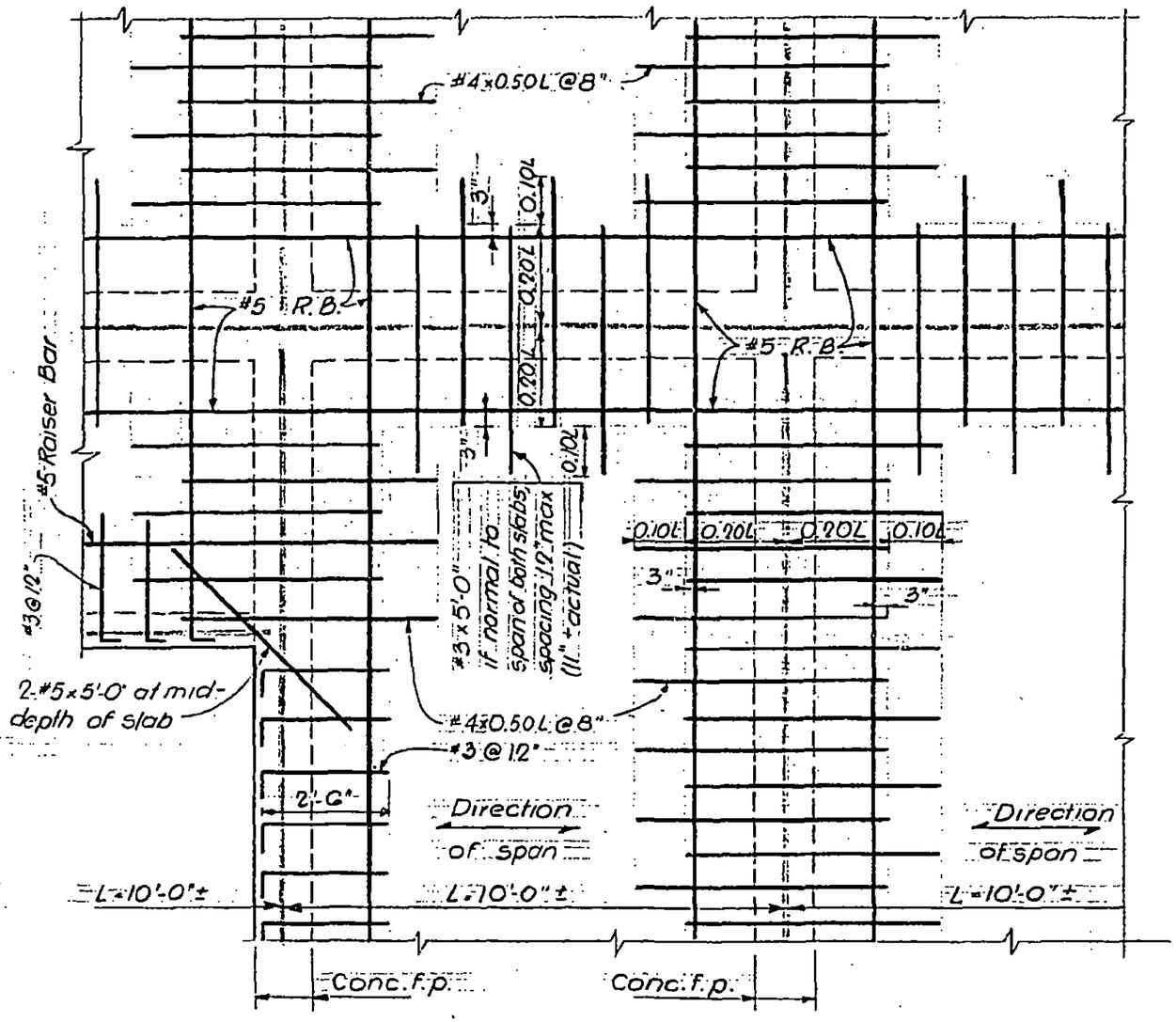
8-AB4-21.1

SKILLING - HELLE - CHRISTIANSEN - ROBERTSON Structural & Civil Engineers

PROJECT THE WORLD TRADE CENTER | TITLE TYPICAL SLAB AT El. 274', 284', 294', 310', | DATE 5-1-68

REVISIONS

8-20-68



Top Bars

Notes:

1. Where "L" of adjacent spans varies, use the larger of the two.
2. Where "L" on both sides of a beam is not larger than 7'-0" for end spans or 8'-0" for interior spans, use #4 @12" top bars instead of #4 @8".
3. Raiser bars are shown schematically only. See Notes on 8-AB1-3.1.

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UNIVERSITY OF THE STATE OF NEW YORK

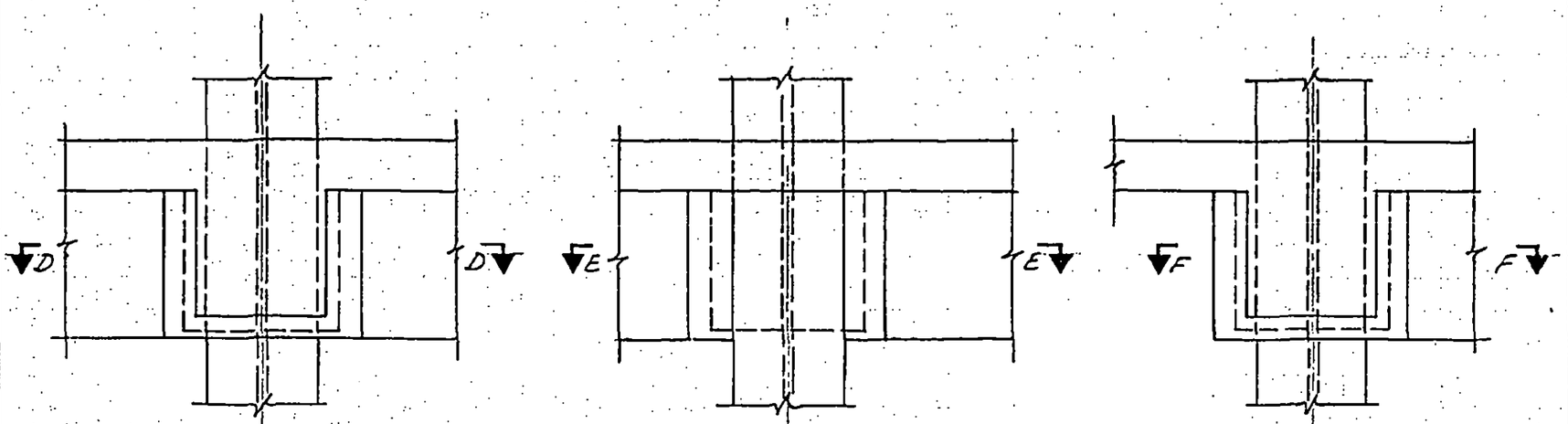
8-AB4-21.2

SKILLING - HELLE - CHRISTIANSEN - ROBERTSON Structural & Civil Engineers

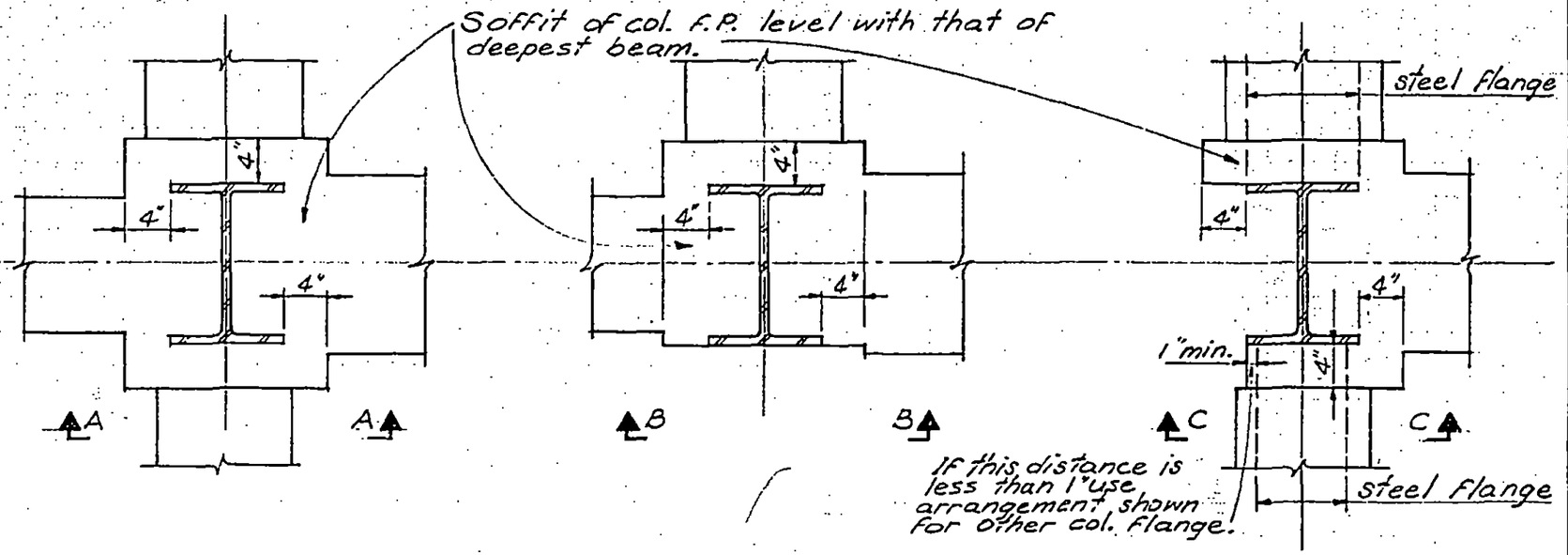
PROJECT THE WORLD TRADE CENTER | TITLE FIREPROOFING AT WF COLs BELOW EL. 310' | DATE 5-1-68 J.L.M.

REVISIONS

8 - 20 - 68



Section A-A Section B-B Section C-C



Sect. Plan D-D Sect. Plan E-E Sect. Plan F-F

Typical where a beam frames into each face of col.

Typical where no beam is connected to one col. flange.

Typical where no beam is connected to one side of col. web.

Note: Provide WWF as Details 8-AB1-5 & 6

8-AB4-22

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WTU-1064-LERA